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# MERCURY CAPSULE NO. 14
# CONFIGURATION SPECIFICATION
# (MERCURY-LITTLE JOE NO. 5A)
# (Title Unclassified)

REPORT 6603-14 SERIAL NO. 56

McDONNELL Aircraft Corporation St Louis, Mo



NASA Use Only



SUBMITTED UNDER National Aeronautics and Space Administration Contract NAS 5-59 (NASA)

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF FIGURES

1.0 SCOPE AND CLASSIFICATION

1.1 SCOPE - This configuration specification shall define the details of design, construction, and equipment requirements for an Instrumented Capsule (MAC No. 14/LJ-5A) as follows:

NASA Designation . . . . . Project Mercury

Designer's Name . . . . . McDonnell Aircraft Corporation (MAC)

Model Designation. . . . . Model 133K

Number and Places for Crew . . . . . One Cabin Enclosure

Launch Vehicle . . . . . Little Joe Booster

1.1.1 MISSION - The purpose of Little Joe No. 5A shall be to qualify the Mercury Capsule escape system and other systems which must function during and after escape at the combination of dynamic pressure, Mach number, altitude and flight path angle that represent the most severe conditions that can be anticipated during an orbital launch on an Atlas booster. Flight trajectories or other calculations will be based on atmosphere given in Figure 2.

1.1.1.1 The objectives of the ballistic test flight of Capsule No. 14 in combination with a modified Little Joe booster shall be as follows:

a. Demonstrate the performance of the capsule escape system and other systems which must perform during and after an escape maneuver.

b. Demonstrate the structural integrity of Mercury Capsule and escape system during an escape initiated at the highest dynamic pressure that can be anticipated during an Atlas launch for orbital flight.

c. Determine the flight dynamic characteristics of Mercury Capsule in an escape maneuver.

d. Establish the adequacy of the capsule landing and recovery system.

e. Establish the suitability of the capsule recovery procedures.

f. Establish prelaunch checkout procedures for the functioning capsule systems.

2.0 APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS - McDonnell Aircraft Corporation's prime objective relative to Government specifications shall be in compliance with applicable documents to the most practicable extent, with the object of providing an optimum operational vehicle within the specified time schedule.

2.1 REFERENCES - The following documents are referenced herein:
MAC Report No. 6495, "Project Mercury Specification Applicability Criteria", dated 4 December 1958, Revised 1 July 1959.

MAC Drawing No. 45-00003, "Qualification Status List".

NASA Specification No. S-6, "Specification for Manned Space Capsule", Revised 26 January 1959.

2.1.1 In event of a discrepancy between this document and any document referenced herein, this specification shall take precedence.

2.2 PROCESS SPECIFICATIONS - The following MAC Process Specifications shall apply specifically to the Project Mercury capsule herein:

| P.S. No. | TITLE |
|---|---|
| 11051 | Cementing of Heat Blankets for Model 133 |
| 11224 | Sealing of Model 133 Capsule |
| 12301 | Cleaning of Model 133 Environmental Control System Lines and Nonoperating Components. |
| 12420 | Chromic Acid Treatment of Aluminum Tanks for Model 133 |
| 13214 | Black Oxide Finish for High Emissivity for Model 133 |
| 13334 | Preparation and Application of Coatings to Interior Surfaces of Sealed Cabin Area of Model 133 |
| 13430 | Exterior Paint Finishing of Model 133 Capsules |
| 14039 | Fabrication of Model 133 Tower Insulation |
| 16001.5 | Marking of Model 133 Parts and Assemblies |
| 17046 | Care, Handling, Storage and Assembly of Model 133 Glass |
| 17172 | Waterproofing of Electrical Connectors for Continuous Operating Temperature up to 500°F |

2.2 PROCESS SPECIFICATIONS - (Continued)

| P.S. No. | TITLE |
|---|---|
| 17305 | Sealing of Printed Wiring for Model 133 Flight Test Instrumentation |
| 17400 | Installation of Electrical Wiring in Model 133 |
| 17410 | Fabrication of Electrical Wire Assemblies for Model 133 |
| 17410.1 | Assembly of Electrical Cable Terminals and Splices for Model 133 |
| 17410.2 | Assembly of Electrical Connectors for Model 133 |
| 17410.3 | Assembly of Radio Frequency Cables for Model 133 |
| 20106 | Storage and Handling of Silver Zinc Batteries for Model 133 |
| 20113 | Care, Handling and Storage of Model 133 Pyrotechnics |
| 20204 | Repair for Skin Puncture on Model 133 Capsule Wall |
| 20500 | Fabrication and Housekeeping Policies Applicable to Model 133 |
| 20501 | Requirements for Special Assembly Areas for Model 133 |
| 20505 | Storage and Handling of Model 133 Environmental Control System |
| 21030 | Leak Testing of Model 133 Structural Assemblies |
| 21311 | Incoming Inspection of Model 133 Space Capsule Coatings |
| 22810 | Soft Soldering of Electrical Connections for Model 133 |
| 23502 | Acceptance Procedure for Model 133 Forward Viewing Window Assembly |

2.3 CONTRACT CHANGE PROPOSALS - The following Contract Change Proposals (CCP's) have been incorporated and shall be considered basic to this configuration specification as approved through negotiation with NASA:

| CCP | TITLE |
|---|---|
| 3 | Posigrade Rocket Installation |
| 41 | Reefed Ring - Sail Landing Parachutes, Installation of |

2.3 CONTRACT CHANGE PROPOSALS - (Continued)

| CCP | TITLE |
|---|---|
| 42 | Orbit Light; Specification Requirement Deletion |
| 43 | Instrumentation Changes; Subcarrier Oscillator and Commutator Replacements |
| 44 | Impact Pressure Measurement; Deletion of Requirement |
| 48 | Low Power Telemetry, Power Output Increase |
| 58-1 | Astronaut Emergency Egress Hatch Installation |
| 66 | Communications Systems; Frequency Changes |
| 73 | Astronaut Observation Window Installation |
| 74 | Rescue Aids Switch By-Pass Relay and By-Pass Switch for 30 Second Retro Firing Delay |
| 76 | Main Instrument Panel Redesign |
| 84 | Telemetering of Posigrade Rocket Firing |
| 91 | Elimination of Minitrack/Microlock Beacon |
| 93 | SOFAR Bomb Installation |
| 98 | Smoke Recovery Aid; Removal of |
| 101 | Post Landing Operational Sequence Change for Capsule Instrumentation |
| 113 | Modifications to Escape Tower |
| 217 | Capsule Dye Marker Change |
| 226 | Incorporation of a 5 psi Differential Cabin Pressure Control Valve |
| 238 | Modification of Capsule 14 and Support for Little Joe 5 "A" Mission |
| 239 | Triple Nozzle Installation on Jettison Rockets |

2.4 REQUEST FOR ALTERATION - The following requests for alteration recommended during the Development Engineering Inspection (DEI) of Project Mercury Capsule No. 7, on 16 August through 18 August 1960, have been incorporated.

| RFA No. | SUBJECT |
|---|---|
| 30* | Capsule Booster Umbilical Door |
| 44 | Cabin Pressure Control |
| 62 | Track Assignments |
| 91 | Sea Marker Dye |

* Weight change only.

## GENERAL ARRANGEMENT
(MERCURY CAPSULE AND ADAPTER)

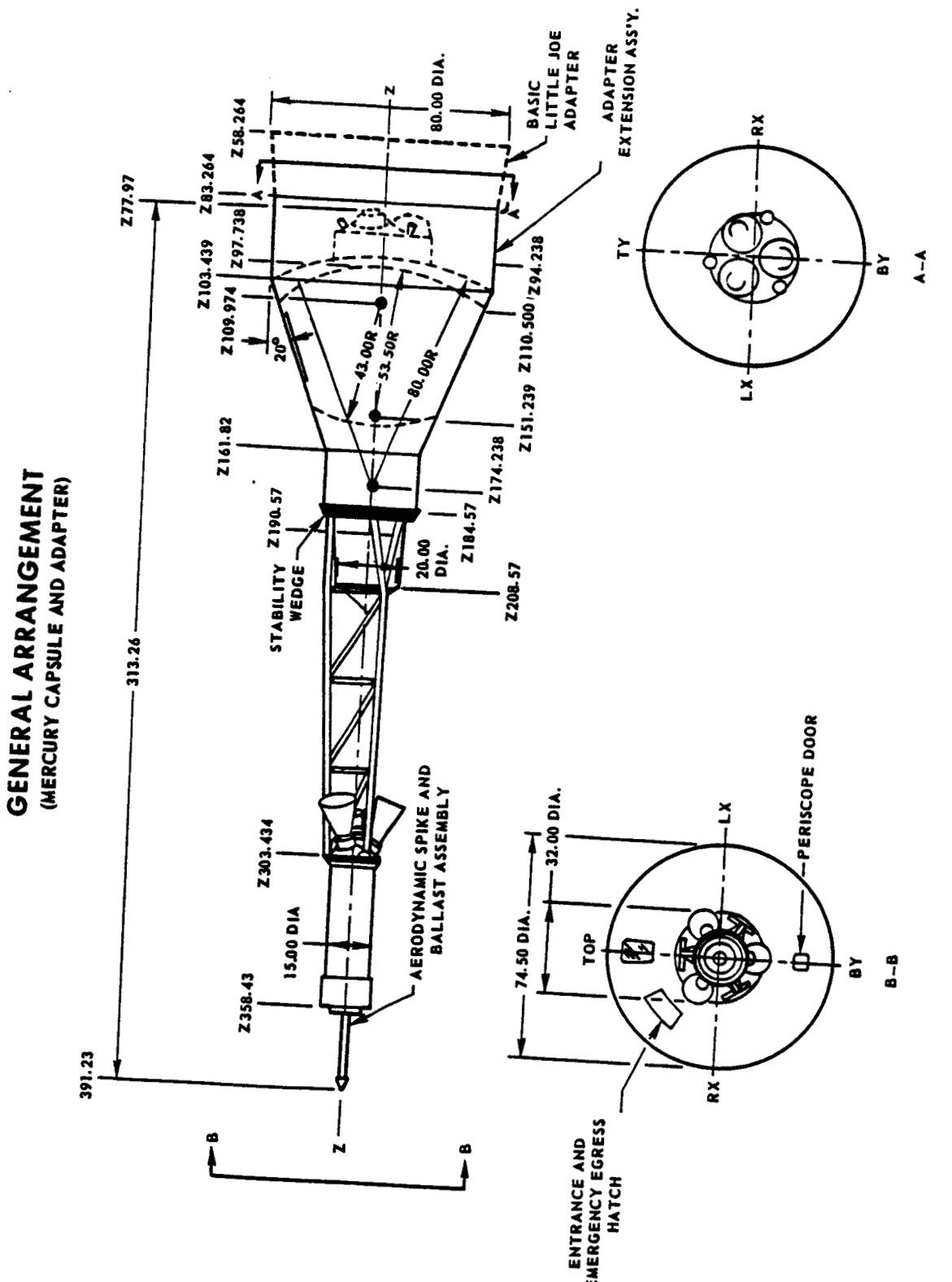


FIGURE 1

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3.0 REQUIREMENTS

3.1 CHARACTERISTICS

3.1.1 WEIGHT AND BALANCE - Specification MIL-W-25140 and Technical Order 1-1B-40 shall be utilized as reference guides.

3.1.1.1 GROSS WEIGHT - Such ballast shall be added in a manner to obtain weight and center of gravity location similar to the manned orbital capsules or the launch weight and center of gravity of Mercury Capsule No. 3.

Actual weight breakdown and center of gravity of the capsule as described herein are included.

3.1.1.2 ABORT WEIGHT - Abort weight is defined as the gross launch weight of the Project Mercury No. 14 capsule less the adapter and the retrograde rocket assembly plus the escape system.

3.1.1.3 IMPACT WEIGHT - Impact weight is defined as the abort weight of the Project Mercury No. 14 capsule, less the main parachutes, nose cone assembly, and SOFAR bomb.

3.1.1.4 WEIGHT AND BALANCE SUMMARY

(a) Vehicle Weight Breakdown

| ITEM | DELIVERED WEIGHT | BALLASTED TO CAPSULE NO. 3 WEIGHT |
|---|---|---|
| Structure | 569.39 | 569.39 |
| Clamp Ring - Capsule to Adapter | 35.38 | 35.38 |
| Escape System | 1049.60 | 1040.62 |
| Unaccountable | -1.32 | -1.32 |
| Heat Sink | 343.18 | 343.18 |
| Reaction Control Group | 28.02 | 28.02 |
| Retrograde System | 279.43 | 279.43 |
| Landing System | 184.82 | 184.82 |
| Instruments and Navigation Equipment | 91.85 | 91.85 |
| Electrical Group | 244.83 | 244.83 |
| Communications | 74.58 | 74.58 |
| Environmental Control System | 36.99 | 36.99 |
| Telemetry and Recording | 68.35 | 68.35 |
| Recovery Gear | 18.57 | 18.57 |
| Crew and Survival Equipment | 1.30 | 1.30 |
| Pallet | 182.85 | 182.85 |
| Ballast | 618.19 | 547.06 |
| Actual Weight Adjustment | 30.85 | 30.85 |
| Gross Weight Launch Vehicle | 3856.86 | 3776.75 |

3.1.1.4 WEIGHT AND BALANCE SUMMARY - (Continued)

(b) Capsule No. 14 Weight and Balance Mission History

| ITEM | DELIVERED WEIGHT | DELIVERED C.G.* | BALLASTED TO CAPSULE NO. 3 WEIGHT | BALLASTED TO CAPSULE NO. 3 C.G.* |
|---|---|---|---|---|
| Gross Weight-Launch | 3856.86 | 172.07 | 3776.75 | 172.53 |
| Less: | | | | |
| Clamp Ring-Adapter to Capsule | -35.38 | | -35.38 | |
| Retrograde/Posigrade Assembly | -254.95 | | -254.95 | |
| Abort Weight | 3566.53 | 178.78 | 3486.42 | 179.44 |
| Less: | | | | |
| Escape Rocket Propellant | -293.20 | | -293.20 | |
| Abort Weight-No Fuel | 3273.33 | 165.53 | 3193.22 | 165.91 |
| Less: | | | | |
| Unaccountable | +1.32 | | +1.32 | |
| Escape Tower | -756.40 | | -747.42 | |
| Coast Phase Weight | 2518.25 | 124.12 | 2447.12 | 124.11 |
| Less: | | | | |
| Nose Cone Assembly | -80.39 | | -80.39 | |
| Main Chute Design Weight | 2437.86 | 121.73 | 2366.73 | 121.64 |
| Less: | | | | |
| Main Chute | -63.83 | | -63.83 | |
| SOFAR Bomb | -1.98 | | -1.98 | |
| Impact Weight | 2372.05 | 120.45 | 2300.92 | 120.32 |
| Less: | | | | |
| Reserve Chute | -62.29 | | -62.29 | |
| Pilot Chute | -3.57 | | -3.57 | |
| Dye-Marker | -2.50 | | -2.50 | |
| Flotation Weight | 2303.69 | 119.06 | 2232.56 | 118.89 |

* C.G. Location is given as Z station. Edge of heat sink is Z = 103.44.

3.2 GENERAL DESCRIPTION

3.2.1 CONFIGURATION - The capsule configuration shall be of the type shown in Figure 1 and shall fulfill the requirements specified herein. The capsule shall be comprised of the following:

a. Structure (See Paragraph 3.4)

b. Heat and Micrometeorite Protection (See Paragraph 3.6)

c. Booster Adapter and Separation System (See Paragraph 3.7)

d. Consoles (See Paragraph 3.8.8)

e. Instrumentation and Display (See Paragraph 3.8.9)

f. Environmental Control System (See Paragraph 3.9)

g. Retrograde Rocket System (See Paragraph 3.11)

h. Escape System (See Paragraph 3.12)

i. Power Supplies (See Paragraph 3.13)

j. Communication Equipment (See Paragraph 3.14)

k. Recording Equipment (See Paragraph 3.15)

l. Navigational Aids (See Paragraph 3.16)

m. Landing and Post Landing System (See Paragraph 3.17)

n. Posigrade Rocket System (See Paragraph 3.11.4)

o. Handling Provisions (See Paragraph 3.18)

p. Pyrotechnics (See Paragraph 3.20)

3.2.2 SELECTION OF MATERIALS - Mission requirements of the capsule dictate use of high temperature resistant materials. Heat resisting materials such as titanium, beryllium, steel, nickel base alloy (Rene' 41), and insulation materials such as Thermoflex, Fiberglas and ceramic coatings shall be used. Where practicable, materials in accordance with the requirements of ANA Bulletins 143d and 147r shall be utilized.

3.2.3 FABRICATION - Structural design concepts of the capsule emphasize employment of proven manufacturing techniques and methods to the greatest possible extent. Maximum use shall be made of developed "off-the-shelf" components fabricated by dependable subsystem manufacturers. McDonnell Aircraft Corporation standards of workmanship, processes and procedures are based on fabrication of production articles according to military standards

3.2.4 INTERCHANGEABILITY AND REPLACEABILITY - The interchangeability and replaceability intent of Specification MIL-I-8500A(ASG) shall be met on those items of equipment possessing identical physical characteristics and functions in relation to capsule usage as defined in MAC Report No. 6495, revised 1 July 1959. Interchangeability and replaceability requirements are not considered mandatory on basic capsule structure. Interchangeability and replaceability for those equipment items as set forth in this paragraph shall be assured by design requirements, nature of manufacture, and monitoring by contractor personnel, and need not be physically demonstrated by the exchange or removal of equipment items from the capsule and replacement of these items in a formal demonstration.

3.2.5 FINISH - Definition of finish requirements shall be as specified in the finish specification, McDonnell Drawing No. 45-90000.

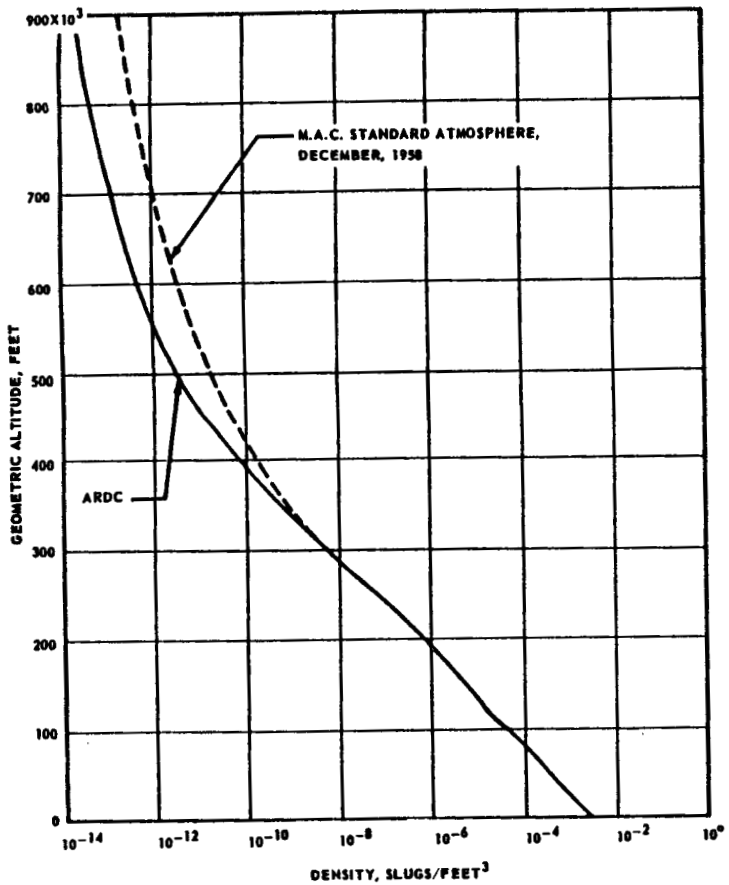
3.2.6 IDENTIFICATION AND MARKING - MIL-STD-130 shall be considered as a reference guide in identification of the capsule and capsule components. Marking shall be in accordance with Specification MIL-M-25047 as applicable. MAC Drawing No. 45-00009 shall define external capsule color requirements and shall specify that the words "UNITED STATES" in six inch (6") block letters, shall be painted on opposite sides of the capsule. Capsule test cable plug or receptacle identification shall be in accordance with MAC Drawing No. 45-00010.

3.2.7 EXTREME ENVIRONMENTAL REQUIREMENTS - Trajectory characteristics shall be based on the atmospheric density and temperature variations of ARDC 1959 Model atmosphere. Earlier data, as presented in Figure 2, may be used when its use is not critical or when it is compatible with ARDC 1959 Model atmosphere. The capsule, all subsystems, and components shall be designed to withstand the environmental conditions which are expected to be encountered during the mission outlined in Paragraph 1.1.1.

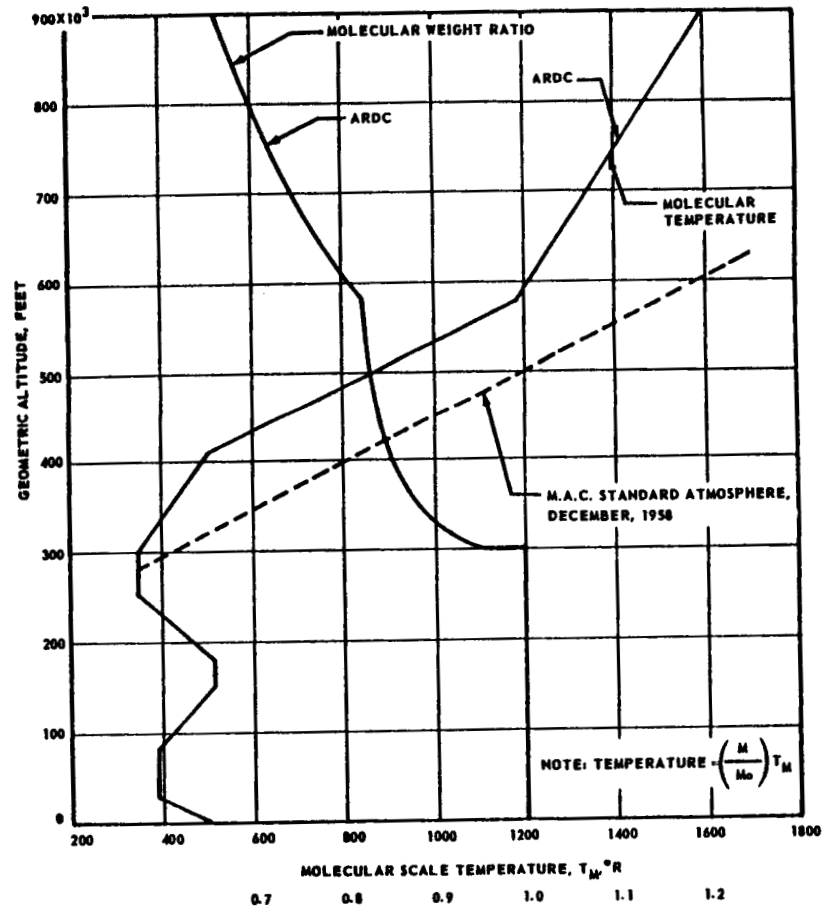
3.2.8 LUBRICATION - Lubrication of components where required shall be in accordance with the requirements of Specification MIL-L-6880B. Lubrication data shall be included in maintenance handbooks. No petroleum base lubricants shall be used. Lubricants shall be of the silicone base, fluorolube, oxylube 702, and dry film type. Lubrication shall not cause any toxic or flammable substances to occur in the astronaut's compartment or in the environmental control system.

3.2.9 RELIABILITY - An integrated reliability program shall be conducted throughout the design, development and fabrication of the Mercury capsule. This shall include the salient features outlined in Specification MIL-W-9411 to the most practicable extent within the scope of the program. The design approach shall emphasize the safety of the mission. Although not specified herein in every instance due consideration shall be given to simplicity, redundancy, and the use of back-up systems in order to improve mission reliability.

## ATMOSPHERIC PROPERITIES




(A) ATMOSPHERIC DENSITY VERSUS GEOMETRIC ALTITUDE




(B) MOLECULAR TEMPERATURE AND MOLECULAR WEIGHT RATIO VERSUS GEOMETRIC ALTITUDE

FIGURE 2

3.3 AERODYNAMIC AND HYDRODYNAMIC CONSIDERATIONS - The design configuration of the capsule described herein relative to aerodynamic and hydrodynamic considerations has been based on the following:

a. The overall capsule configuration at the time of re-entry shall be statically stable in the heat sink forward attitude.

b. Correct attitude during the re-entry phase shall be facilitated by use of a destabilizer flap located on the top of the antenna fairing opposite the roll axis horizon scanner.

c. An aerodynamic spike and ballast assembly shall be provided for mounting on top of the escape rocket structural assembly. This assembly shall reduce supersonic launch and escape drag.

d. Re-entry forebody shape effect on water and land impact loads.

e. Design landing condition of the capsule has been based on impacts on both water and land, within the structural design parameters defined in MAC Report No. 6693, revised 3 August 1960.

f. The capsule shall be bouyant and hydrodynamically stable upright in the water, heat sink assembly down, and shall be capable of righting itself.

3.4 STRUCTURAL DESIGN CRITERIA - Structural design criteria of Mercury capsule shall be as defined in MAC Report 6693, revised 3 August 1960 and Paragraphs 2.4 through 2.4.2.5 of NASA Specification S-6 revised 26 January 1959. Specifications MIL-A-8629(ASG) and MIL-S-5700 (USAF) series shall be used as reference guides.

3.5 CAPSULE

3.5.1 DESCRIPTION - The Mercury capsule shall be of a conical configuration having an extremely blunt forebody (in the re-entry attitude) with booster adapter attachment fittings and an afterbody which tapers to a juncture with a cylindrical section which shall support a truncated antenna cone and escape system pylon and rockets. The contours of the forebody shall be such as to provide the maximum practical wave drag and uniform surface heating consistent with other requirements. The afterbody configuration shall augment stability and provide adequate volume, and low heating as well as requirements for parachute stowage and escape system attachment. The overall capsule configuration at the time of re-entry shall be stable in the normal re-entry angle of attack. Internal volume of the capsule shall be based on a human occupant five feet ten and one-half inches (5' - 10-1/2") tall and weighing one-hundred and eighty (180) pounds.

3.5.2 CONSTRUCTION - The capsule shall be semimonocoque titanium construction consisting of a conical and a cylindrical section. The conical section shall consist of an unbeaded inner skin seam welded to a beaded outer skin with 24 equally spaced longitudinal stringers; two bulkheads form the pressurized cabin area. The cylindrical section shall have a single skin with 12 equally spaced stringers and internal shear webs which support the parachutes. The capsule structure shall be protected from heat, noise and micrometeorites by insulation and an outer covering of shingles plus a heat sink which shall absorb heat during re-entry.

3.5.3 ENTRANCE AND EMERGENCY EGRESS HATCH - The entrance and emergency egress hatch, in accordance with MAC Drawing No. 45-35003 located in the capsule conical section, shall be trapezoidal in shape as dictated by the capsule configuration (see Figure 1). The hatch assembly shall be of construction similar to the basic capsule structure. A dummy explosive assembly simulating that shown on MAC Drawing No. 45-35701 shall be incorporated in the hatch assembly. The dummy explosive assembly shall be mounted about the hatch perimeter and shall consist of a gasket type sill.

3.5.4 EXIT HATCH - The exit hatch in accordance with MAC Drawing No. 45-32023 shall be located in the small afterbody pressure bulkhead. The hatch shall be dish-shaped and shall be an inward opening, plug type hatch of reinforced aluminum construction. The hatch shall be held in place by a retaining ring which, when latched in place, shall cause the hatch to seal to the small pressure bulkhead.

3.5.5 WINDOW - An observation window assembly shall be provided. This assembly shall be located in the afterbody conical section from stations Z124.81 to Z144.80. The window assembly shall consist of an outer window assembly in accordance with MAC Drawing No. 45-35030 and an

3.5.5 WINDOW - (Continued)

inner window assembly in accordance with MAC Drawing No. 45-35035. Window shape shall be trapezoidal as dictated by the capsule conical configuration with the base of the trapezoid toward the heat sink end as indicated in Figure 1 herein. The outer window assembly shall consist of a single pane of 0.350 inch Vycor glass contoured to the capsule structural shell curvature. The outer pane shall possess grade 2N optical fidelity in its two critical areas. Grade 2N glass shall permit an optical deviation of 2 minutes of arc. Location of critical areas shall be such as to be compatible with reference sight lines on the inner window assembly. The outer pane shall be mounted in a structural frame, with suitable sealing gaskets on the inner and outer surfaces and spacers supporting the edge inside the frame. The inner window assembly shall consist of three (3) flat panes of glass of the trapezoid configuration, each having an optical fidelity of grade 2N. The two (2) inner panes shall be 0.340 inch tempered glass and the outermost pane of the inner window assembly shall be 0.170 inch Vycor glass. The outermost pane shall contain lateral reference sight lines on the inner and outer surfaces. The inner window panes shall be mounted in individual supporting rings, independently sealed by gaskets on upper and lower surfaces and held firm by spacers around the edge inside the ring. The pane assemblies shall be supported by a structural frame which shall be attached and sealed to the capsule inner structure. The inner surface of the outer window pane and both surfaces of the inner window assembly panes shall be coated with a single layer of magnesium fluoride ($M_gF_2$) film for impeding thermal radiation in the cabin.

3.5.6 ANTENNA FAIRING - An antenna fairing, in accordance with MAC Drawing No. 45-31003, shall be installed between the cylindrical recovery compartment and the escape tower and shall extend from Sta. Z184.57 to Z208.57. An eight (8) inch window assembly consisting of a silicone base, fiberglass insulation, vycor glass, and teflon strips, shall be located around the outer base of the antenna fairing and shall act as a dielectric for the main biconical antenna. A destabilizer flap assembly, in accordance with MAC Drawing No. 45-31026, shall be attached to the upper extremity and outer edge of the antenna structural assembly. The destabilizer flap shall prevent the capsule from becoming stable with the heat sink forward. Prior to capsule tower separation, the destabilizer flap, which shall be spring loaded to the outboard position, shall be held flat against the antenna fairing by means of a quick release pin attached to the escape tower. The flap shall be released upon escape tower jettison. The antenna fairing shall be automatically jettisoned from the capsule as the capsule descends to 10,000 feet altitude. (See Para. 3.17.1.2).

3.5.7 ANTENNA COVER - An antenna cover assembly, in accordance with MAC Drawing No. 45-31036, shall be incorporated in the escape tower structural assembly. The cover assembly shall shield the antenna fairing during the launch period.

3.6 HEAT AND MICROMETEORITE SHIELDING

3.6.1 FOREBODY HEAT PROTECTION - The capsule shall be protected by a dish-shaped heat sink which shall form the forward surface (forebody) of the capsule. The heat sink, in accordance with MAC Drawing No. 45-32051, shall be fabricated of hot pressed sintered QMV grade beryllium, forged to its final size of 74.5 inch diameter with an 80 inch spherical radius. The beryllium heat sink shall also provide protection from loads imposed by launching accelerations, retrograde rocket firing, parachute deployment and dynamic air loads. Design consideration has been given to landing loads on the heat sink to insure that the pressure vessel is not punctured on water landings. The heat sink shall be attached to the capsule conical structural assembly (afterbody) by a titanium attach ring. The attach ring, riveted to the capsule structure assembly, shall contain 48 elongated holes (to allow for thermal expansion) to mate with bolt holes spaced about the rim of the heat sink.

3.6.2 AFTERBODY HEAT PROTECTION - Afterbody heat protection shall consist of a radiation shield on the outside surface with insulation between this shield and the primary structure. The radiation shield shall be composed of numerous individual corrugated shingles attached by bolts through oversize holes to allow thermal expansion while remaining within acceptable flutter limits. Shingle material shall be Rene' 41 on the antenna fairing and conical afterbody section and aluminum on the cylindrical recovery compartment. Thermal leakage to the inner structure shall be minimized by using insulation between the outer and inner skin. This insulation shall also serve to attenuate the external noise level.

3.6.3 MICROMETEORITE PROTECTION - Protection of the underlying pressure capsule against impacts from micrometeorites shall be provided by the use of the corrugated shingles specified above.

3.7 BOOSTER ADAPTER - NASA shall be responsible for matching Mercury Capsule No. 14 to a modified Little Joe No. 5A booster. The capsule shall be used in a manner which requires a minimum of modification to the booster system. The booster adapter assembly for mating Mercury Capsule No. 14 to the Little Joe No. 5A booster shall be of conventional semimonocoque aluminum, steel and magnesium construction. This shall consist of a basic Little Joe adapter and an adapter extension assembly, NASA No. 803305, which shall provide the additional length required to accommodate the retropackage. The adapter extension assembly shall consist of a machined structural frame utilizing (1) a special Atlas adapter ring, MAC Drawing No. 45-33501, which shall be fabricated and installed by NASA; (2) a capsule match ring, NASA No. 803297; (3) a top adapter ring, NASA No. LC 803295; (4) a bottom adapter ring, NASA No. LC 803296; (5) a pressure plate, NASA No. LE 802861, which shall be held in place by (3) and (4), and with an aluminum sheet metal skin of sufficient thickness to withstand the required loads. NASA shall furnish the adapter extension assembly to MAC for incorporation of the necessary wiring and rework. The adapter extension assembly shall then be shipped to the launch site with the capsule, assembled, and then the capsule and adapter extension assembly shall be attached to the basic adapter on the Little Joe No. 5A booster. MAC shall be responsible for the design and manufacture of a clamp ring assembly which shall be used to attach the capsule to the adapter assembly. The clamp ring assembly shall consist of three (3) segmented sections joined by three (3) explosive tension bolts. Two (2) of the explosive bolts can be initiated electrically from either end by a dual electric system. The third explosive bolt may be initiated electrically from one (1) end only on Capsule No. 14.

3.8 CREW STATION - The crew station in Capsule No. 14 shall be basically identical to manned capsule crew stations, except for the special instrumentation provided for the mission requirements as defined in Para. 1.1.1 herein. Equipment for astronaut support such as the support couch, restraint system, hand controller, emergency handle, food and water, and waste handling shall not be required in this capsule.

3.8.1 CONSOLES

3.8.1.1 RIGHT-HAND CONSOLE - The right-hand console in accordance with MAC Drawing No. 45-81002 shall contain no controls for the mission of Capsule No. 14 as defined in Para. 1.1.1 herein. The right-hand console shall be finished in light blue space capsule coating XA-266 compatible with the life support color code as applied to the main instrument panel.

3.8.1.2 LEFT-HAND CONSOLE - The left-hand console in accordance with MAC Drawing No. 45-81110 shall consist of two panels; the inner panel adjoining the instrument panel, and the outer panel. Only those instruments necessary for the mission of Capsule No. 14 shall be installed. The left-hand console inner panel shall be finished in light brown space capsule coating XA-263 and the outer panel shall be finished in dark brown space capsule coating XA-264, except for the pressurization controls area which shall be finished in light brown XA-263.

3.8.2 INSTRUMENTATION AND DISPLAYS - A main instrument panel assembly in accordance with MAC Drawing No. 45-81100 shall be provided. The instrument panel shall be supported from capsule structure on the upper left and by the periscope housing (see Para. 3.16.1). The instrument panel shall extend around both sides and the top edge of the periscope such that the scope display shall appear in the lower center of the instrument display. This installation shall provide an optical reference point which falls at the intersection of Station FZ135.59 and TY5.780. All instruments shall have white indices on black background. The instrument panel shall be coded to indicate specific functional areas by color. These shall be as follows:

| FUNCTION | SPACE CAPSULE COATING |
|---|---|
| Life Support | Light Blue XA-266 |
| Electrical | Light Green XA-267 |
| Radio | Dark Green XA-269 |
| Warning | Medium Green XA-268 |
| Flight | Light Grey XA-265 |
| Altitude and Descent | Tan XA-262 |
| Fuel Indication | Dark Brown XA-264 |

3.8.2 INSTRUMENTATION AND DISPLAYS - (Continued)

Basic instrumentation, depicting transmitting and/or recording methods for obtaining measurements defined below are as illustrated in Figure 6, Page 40. Instrumentation specified below shall be provided by the contractor.

| (a) Vehicle Measurements | Panel Indication | Recording Method (See Figure 6) |
|---|---|---|
| Time Reference (See Paragraph 3.8.3) | X | X |
| Visual Attitude Reference (See Paragraph 3.16.1) | X | - - |
| (b) Operational Measurements | | |
| A.C. Voltage | X | X |
| D.C. Voltage | X | X |
| D.C. Current | X | X |

3.8.3 TIME REFERENCE INDICATION - An interim satellite clock in accordance with MAC Drawing No. 45-81059 shall be provided as specified in Appendix I-C, Item 2 herein. This clock a spring driven chronometer, shall indicate time of day and elapsed time (seconds) from launch. The retrograde timing mechanism shall have an adjustable time delay, 250-330 seconds, which shall be preset to the desired time of retrograde prior to launch. The retrograde timing mechanism shall, upon run out of the time delay, provide a retrograde fire signal. Signals of elapsed time from lift-off shall be transmitted to telemetry as indicated in Figure 6, Page 40, herein. Elapsed time (seconds) from launch shall be displayed on a Veeder-Root counter. This clock shall be installed in Mercury Capsule No. 14 in lieu of the satellite clock, MAC Drawing No. 45-81710.

3.8.4 ANGULAR RATE AND ATTITUDE INDICATOR - Not provided on Capsule No. 14.

3.8.5 SEQUENCE SYSTEM AND OVERRIDE CONTROLS - The sequence system shall consist of engraved nameplate and telelight sequence lights with adjacent manually operated override controls. This system shall indicate functional sequence of events by illumination of a green light for normal sequential operation or, after a time delay, by a red light indicating a malfunction and need for subsequent override action. After corrective

3.8.5 SEQUENCE SYSTEM AND OVERRIDE CONTROLS - (Continued)

action has been taken, the telelight shall illuminate green as in normal sequential operation. In order of chronology, the following shall appear on the left-hand console:

| NOMENCLATURE | OVERRIDE CONTROL | SWITCH NO. | PRESENTATION |
|---|---|---|---|
| Launch Control | Toggle Switch | P-1 | Engraved Nameplate |
| Jett Tower | | P-3 | Telelight |
| Sep. Capsule | | P-4 | Telelight |
| Retro Seq. | Push Button | P-6 | Telelight |
| Retro Att. | Toggle Switch | P-8 | Telelight |
| Fire Retro. | Push Button | P-7 | Telelight |
| Jett Retro. | Push Button | P-10 | Telelight |
| Retract Scope | Toggle Switch | P-20 | Telelight |
| .05g | Push Button | P-11 | Telelight |
| Drogue | Push Button | P-12 | Engraved Nameplate |
| Snorkel | | - - | Engraved Nameplate |
| Main | | P-13 | Telelight |
| Reserve | | P-14 | Engraved Nameplate |
| Landing Bag | Toggle Switch | P-25 | Telelight |
| Rescue | Toggle Switch | P-15 | Telelight |

Switch numbers represent manual override controls and correspond to those indicated in the sequential schematic, Figure 4, Page 30.

The guarded push button controls shall provide override control by a dual electrical system for each function desi[illegible]ed. The toggle switches shall function in a left-right direction and their nomenclature shall be as follows (in order of sequence and left-right readings):

| | |
|---|---|
| Launch Control | "Ready-off" |
| Retro Att. | "Auto-Bypass" |
| Retract Scope | "Auto-Man." |
| Landing Bag | "Auto-Man." |
| Rescue | "Auto-Man." |

The telelight assemblies in accordance with MAC Drawing No. 45-79720, shall be rectangular in shape and shall consist of red and green light assemblies, nomenclature caps and retention clips. Legends shall be direct reading, engraved in black on frosted glass plate nomenclature caps and shall be readable when the lights are de-energized. Colors shall be in accordance with FED-STD-3. Brightness of the lights shall be as required by MIL-STD-411 for 24 volts application.

3.8.5 SEQUENCE SYSTEM AND OVERRIDE CONTROLS - (Continued)

The engraved nameplate shall be constructed of aluminum material and shall simulate the telelight assemblies in form and size. Nomenclature on the nameplate shall be white on a black background.

3.8.6 DEAD RECKONING EARTH PATH INDICATION - Not provided on Capsule No. 14.

3.8.7 SWITCHES AND HANDLES - The following switches and handles with their respective nomenclatures and functions shall be located on the instrument panel and left-hand console, as indicated. This tabulation shall be exclusive of sequence system override controls as specified in Para. 3.8.5.

NOMENCLATURE

| Type | Actuation | Function | Location |
|---|---|---|---|
| Toggle Switch | On-Off | Hi-Pwr. Telemetry (Low Frequency) | Left-Hand Console |
| Toggle Switch | ASCS Only - Auto-Fans Only | Standby Inverter (P-18) | |
| Toggle Switch | Emerg-Norm | Audio Bus | |
| Toggle Switch | Bypass-Norm - Pwr. Off | Ammeter | |
| Toggle Switch | ASCS-Fans | A.C. Volts | |
| Toggle Switch | Man-Auto | Standby Battery | Main |
| Toggle Switch | Standby-Norm | Isolated Battery | Instrument |
| Toggle Switch* | ASCS Off-Norm | Electric Power | Panel |
| Toggle Switch | Dim-Bright | Warning Lights | |
| Toggle Switch | R/T-Norm | UHF DF (P-21) | |
| Toggle Switch | Lo Pwr-HI Pwr | UHF Select (P-22) | |
| Toggle Switch | HF-UHF-Off | Transmit | |
| Toggle Switch | Grnd Comd - Cont. | Beacon | |

* Installed but inoperative

3.8.8 SWITCH FUSES - Switch fuses shall be provided for manual reset of interrupted circuits. No special visual systems for indication of an interrupted circuit shall be provided. Switch fuses shall be located on the main instrument panel and on a switch fuse panel located to the outer panel of the left-hand console.

The following switch fuses shall be located on the extreme right of the main instrument panel:

| | |
|---|---|
| Suit Fan | Envir. Contl |
| Retro Jett | Retro Man. |
| Programmer | Spare |

The following switch fuses shall be located on the switch fuse panel as follows:

Spare
Emer Cap Sep Contl
Emer Escape Rckt
Tower Sep Contl
Emer Tower Sep
Emer Tower Jett
Emer Posgrd
Spare
No. 1 Retro Rckt
No. 2 Retro Rckt
No. 3 Retro Rckt
Emer Retro Seq
Emer Retro Jett
ASCS .05g
Emer .05g
Emer Drogue Deploy
Emer Main Deploy
Reserve Deploy
Emer Reserve Deploy
Emer Landing Bag
Emer Rescue Aids
Periscope
Ant Switch
Comd Rcvr A
Low Tel Xmit

3.8.9 LIGHTING - Not provided on Capsule No. 14.

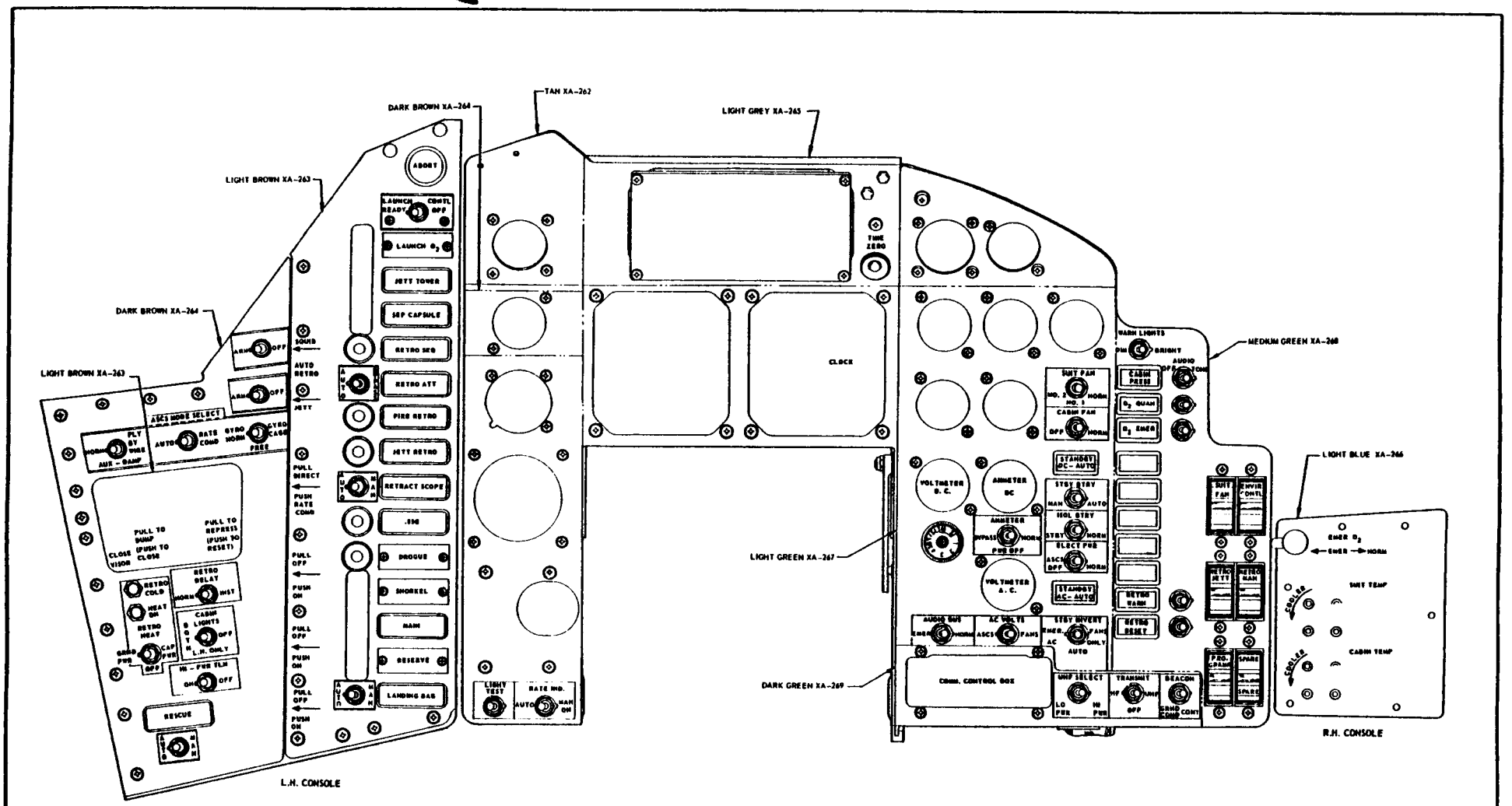

DARK BROWN XA-264
TAN XA-262
LIGHT GREY XA-265
LIGHT BROWN XA-263
DARK BROWN XA-264
LIGHT BROWN XA-263
MEDIUM GREEN XA-268
LIGHT BLUE XA-266
LIGHT GREEN XA-267
DARK GREEN XA-269
L.H. CONSOLE
R.H. CONSOLE
ABORT
LAUNCH O2
JETT TOWER
SEP CAPSULE
RETRO MFG
RETRO ATT
FIRE RETRO
JETT RETRO
RETRACT SCOPE
.05G
DROGUE
SNORKEL
MAIN
RESERVE
LANDING BAG
CLOCK
TIME ZERO
RESCUE
COMM. CONTROL BOX

FIGURE 3

3.9 CAPSULE ENVIRONMENTAL CONTROL

3.9.1 ENVIRONMENTAL CONTROL SYSTEM - A functional environmental control system shall not be provided in Capsule No. 14. The environmental control system components, as specified in Appendix I-C, Item 8, shall provide the following:

a. Cooling, pre-launch

b. Cabin pressure relief

c. Valve, post landing outflow

During the prelaunch phase, Freon 114 refrigerant shall be introduced into the cabin heat exchanger via the capsule umbilical for cooling equipment within the cabin. The cabin equipment fan, energized as power is applied to the capsule, shall circulate air around equipment until re-entry, at 20,000 feet altitude, when it shall be de-energized automatically and the snorkel valves shall open as depicted on the sequential schematic, Figure 4, Page30 . During ascent, the cabin differential valve shall utilize initial cabin oxygen content to maintain a cabin pressure which is 5.5 psi above ambient at altitudes above 13,000 feet.

3.10 STABILIZATION CONTROL SUBSYSTEM - No stabilization control systems shall be provided in Capsule No. 14.

3.10.1 AUTOMATIC STABILIZATION AND CONTROL SYSTEM - Not provided in Capsule No. 14.

3.10.2 RATE STABILIZATION AND CONTROL SYSTEM - Not provided in Capsule No. 14.

3.10.3 HORIZON SCANNER - Not provided in Capsule No. 14.

3.10.4 REACTION CONTROL SYSTEM - Not provided in Capsule No. 14.

3.11 RETROGRADE ROCKET SYSTEM

3.11.1 DESCRIPTION - The retrograde rocket system for Mercury Capsule No. 14/LJ-5A shall consist of three (3) expended Thiokol Model TE-316 solid propellant rockets, with sufficient simulated propellant added to serve as ballast to hold as close as possible to the true C.G. of Mercury Capsule No. 14. Rocket design details and testing shall be as described in MAC Drawing No. 45-50700, (see Appendix I-C, Item 1, herein).

3.11.2 INSTALLATION - The retrograde rocket assembly shall be mounted in a structural assembly in accordance with MAC Drawing No. 45-50002. This shall consist of a structural frame assembly encased within an insulated aluminum housing which shall be secured external to the heat sink by retaining straps. The retaining straps, in accordance with MAC Drawing No. 45-72030, shall be attached to the capsule by retention fittings in accordance with MAC Drawing No. 45-32086, which shall remain engaged only so long as tension exists in the straps and to the rocket structural assembly by a centrally located explosive bolt in accordance with MAC Drawing No. 45-72704. For capsule shipment, an inert explosive bolt shall be provided, but prior to capsule launching, a "live" explosive bolt shall be installed. Jettison of the retrograde rocket assembly shall be effected by release of the retaining straps by firing the explosive ejector bolt, removing tension from the retaining straps, and permitting a compression spring jettison assembly, in accordance with MAC Drawing No. 45-50013, to thrust the retrograde assembly from the capsule. Initiation of the ejector bolt shall be through the abort firing circuitry (see Figure 4, Page 30).

3.11.3 POSIGRADE ROCKET SYSTEM - The posigrade rocket system for Mercury Capsule No. 14 shall consist of three (3) expended Atlantic Research Corporation solid propellant rockets. Sufficient simulated propellant shall be added to serve as ballast to hold as close as possible to the true C.G. of Mercury Capsule No. 14. The dummy posigrade rockets shall be symmetrically mounted in the retrograde rocket assembly housing between the dummy retrograde rockets.

3.12 ESCAPE SYSTEM - An active escape system shall be provided as part of the capsule. This system shall be capable of functioning up to tower separation should it become necessary to abort either prior to or later than the time at which normal abort would occur during the Little Joe No. 5A mission. Escape sequence prior to release of the active escape system for either the normal Little Joe No. 5A mission or any other aborted mission shall be as specified in Paragraph 3.12.5.

3.12.1 DESCRIPTION - The escape system shall include a pylon framework assembly in accordance with MAC Drawing 45-31001, which shall support an escape rocket installation in accordance with MAC Drawing No. 45-51001. The escape rocket installation shall consist of a structural assembly in accordance with MAC Drawing No. 45-51002, an escape rocket in accordance with MAC Drawing No. 45-51700, a pylon jettison rocket in accordance with MAC Drawing No. 45-51701, an aerodynamic spike in accordance with MAC Drawing No. 45-51010, and ballast assembly in accordance with MAC Drawing No. 45-51010. The pylon assembly shall be a tower structure consisting of three (3) longitudinal members of tubular steel construction diagonally braced and shall incorporate an antenna cover assembly for shielding the antenna fairing. The pylon shall be attached to the capsule cylindrical recovery compartment by a clamp ring assembly. A 45° aerodynamic fairing shall be installed over the pylon clamp ring to reduce the pylon ballast weight and to facilitate greater aerodynamic stability of the capsule up to tower separation. The clamp ring assembly, in accordance with MAC Drawing No. 45-72040, shall consist of three (3) segmented sections each joined by explosive bolts in accordance with MAC Drawing No. 45-72702. Two of the explosive bolts shall be initiated electrically from either end by a dual electrical system and the third bolt shall be electrically initiated from one end only. Initiation of the clamp ring separation explosive bolts shall be as described in Paragraph 3.12.5.

3.12.2 ESCAPE ROCKET - The escape rocket, in accordance with MAC Drawing No. 45-51700, shall be supported by the pylon structure and the aerodynamic spike and ballast assembly shall be secured to the escape rocket structural assembly. The escape rocket shall consist of a solid propellant rocket motor with three (3) nozzles canted nineteen (19) degrees from the longitudinal axis of the rocket case and an electrically actuated igniter. The nominal action time for the escape rocket shall be 1.39 seconds with an average resultant thrust of 52,000 pounds at its centerline. Nominal thrust impulse rating of this rocket shall be 56,500 pound-seconds, under conditions specified in MAC Drawing No. 45-51700.

3.12.3 PYLON JETTISON ROCKET - The pylon jettison rocket in accordance with MAC Drawing No. 45-51701, shall be supported by the escape rocket structural assembly. This rocket shall be mounted on the escape rocket longitudinal axis among the canted nozzles. The pylon jettison rocket shall consist of a solid propellant rocket motor, and electrically

3.12.3 PYLON JETTISON ROCKET - (Continued)

actuated igniter utilizing a tri-nozzle exhaust arrangement. The nominal action time for this rocket shall be 1.6 seconds with a maximum resultant vacuum thrust of 765 pounds and total impulse of 1145 pound-seconds, under conditions specified in MAC Drawing No. 45-51701.

3.12.4 ESCAPE SYSTEM PERFORMANCE - The escape system during an escape from the ground launching pad shall propel the capsule to an altitude of approximately 2200 feet. Determination of the nominal escape rocket thrust eccentricity shall be the result of rational analysis which will attain a reasonable compromise between adequate capsule-booster separation distance and tolerable structural lateral load factor characteristics. The analysis shall consider effects such as:

a. Capsule abort conditions as a result of booster malfunction.

b. Booster flight characteristics subsequent to capsule-adapter separation.

c. Capsule escape rocket thrust eccentricity tolerance.

The determination of booster flight conditions leading to the initiation of the abort maneuver and following capsule separation shall not be the responsibility of the capsule contractor.

3.12.5 ESCAPE SYSTEM SEQUENCE - The escape system sequence for the Little Joe No. 5A normal aborted mission or any other aborted mission shall be as specified in the following paragraphs.

3.12.5.1 NORMAL MISSION - The normal mission for Little Joe No. 5A shall be an aborted mission to evaluate the escape system. The abort command shall be initiated by NASA supplied 34.6 second time delay relay. The NASA supplied time delay relay shall be located in the adapter section and shall be NASA installed. Upon receipt of an abort signal from the 34.6 second time delay relay, the capsule "Mayday" light shall be illuminated, a signal sent to the maximum altitude sensor (Time Versus Time Computer) and the capsule adapter clamp ring explosive bolts detonated. The time delay ( $\Delta T$) for tower jettison with relation to time of abort ($T_A$) after time zero shall be as follows:

$$\Delta T, \text{ sec} = 0.5\ T_A + 8.0 \qquad 0 \leq T_A$$

A capsule adapter separation sensor shall detect separation of the adapter clamp ring and initiate firing of the escape rocket which shall propel the capsule from the path of the missile. (See Para. 3.12.4). The capsule adapter ring separation sensor shall also initiate firing of the retrograde

3.12.5.1 NORMAL MISSION - (Continued)

rocket assembly separation bolts and shall close a relay to allow a signal to pass from the maximum altitude sensor to the tower separation bolts. This relay shall prevent firing of the tower separation bolts prior to the firing of the escape rocket. The maximum altitude sensor shall delay firing of the explosive bolts in the tower separation ring until a safe dynamic pressure is reached. A tower ring separation sensor shall detect separation and initiate firing of the tower jettison rocket which shall separate the tower from the capsule. The tower separation sensor shall detect tower separation and shall arm the landing sequence system, which shall commence after a minimum time delay of two (2) seconds.

3.12.5.1.1 TIME SEQUENCE - The programmed time sequence for the Little Joe No. 5A normal mission shall be as follows (Reference Figure 4, Page 30):

| | EVENT | TIME LAPSE (APPROX.) |
|---|---|---|
| a. | Booster firing | $T_o$ |
| b. | Maximum altitude sensor activated capsule adapter bolts initiation, and retrograde assembly separation initiation | $T_o$ + 34.5 sec. |
| c. | Tower separation bolts initiation | $T_o$ + 59.75 sec. |
| d. | 10,000 feet barostat actuated | $T_o$ + 178 sec. |
| e. | Dual inertia switch activated (at impact) | $T_o$ + 499 sec. |

3.12.5.2 ABORTED MISSIONS - For Little Joe No. 5A an aborted mission shall be defined as a mission which has the abort signal initiated by some source other than the 34.6 second time delay relay. Abort indication shall be provided by a red "Mayday" light on the instrument panel which shall indicate an abort.

3.12.5.2.1 ABORT INITIATION - An abort shall be initiated by application of a 28 volt signal to the abort junction in the escape system electrical network. Upon receipt of a signal, the 28 volt source shall be instantly "locked-in" at this junction and shall provide the necessary power source to initiate the abort sequence, consistent with the mode in which the abort maneuver is necessary.

3.12.5.3 ESCAPE SEQUENCE OFF THE PAD AND PRIOR TO TOWER SEPARATION - Not provided on Mercury Capsule No. 14.

# CAPSULE FUNCTIONAL CONFIGURATION

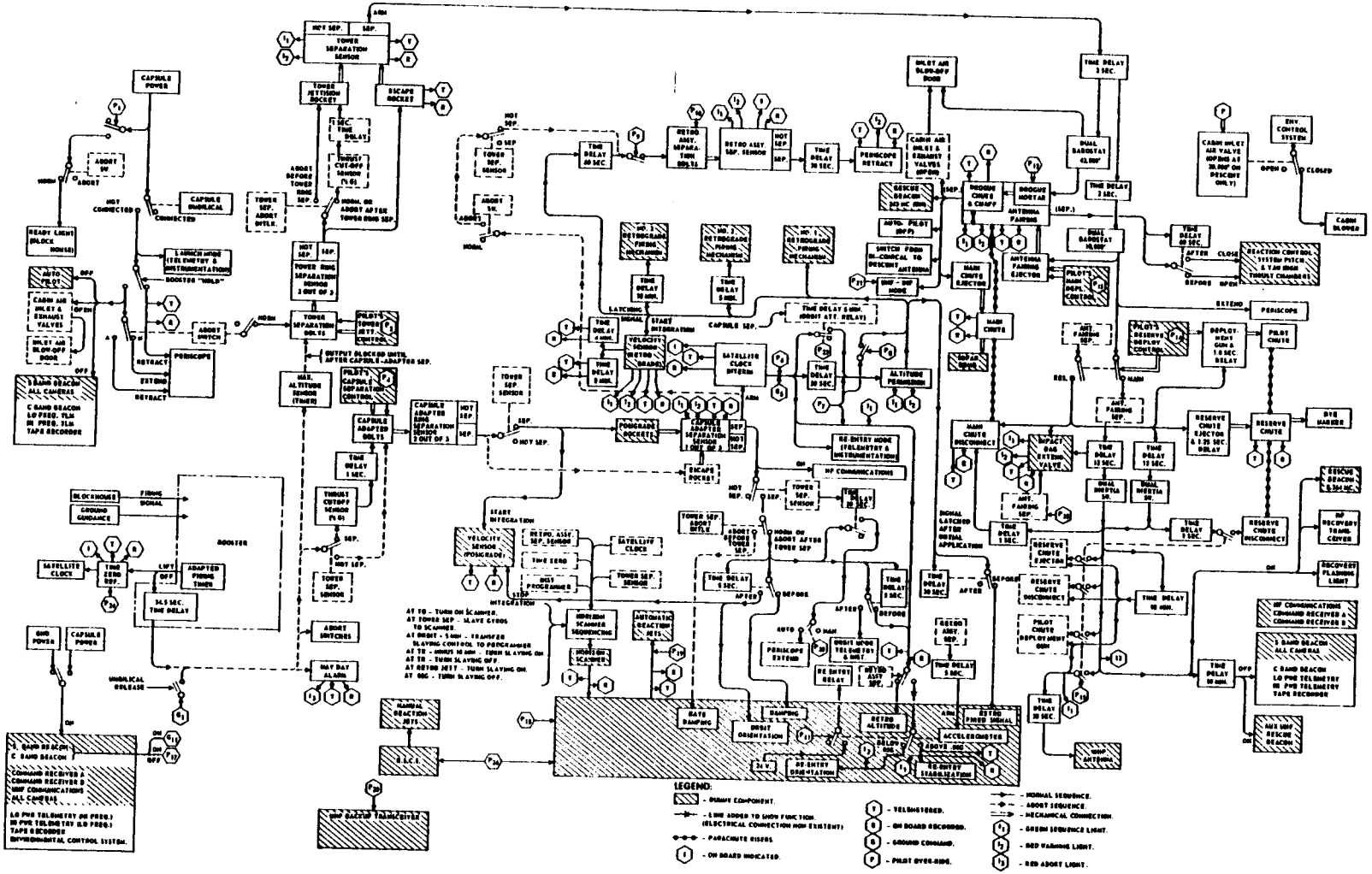



FIGURE 4

3.13 ELECTRICAL POWER SUPPLY SYSTEM - The electrical power supply system shall consist of 6 batteries, in accordance with MAC Drawing No. 45-79707, which comprise the main, standby, and isolated power supplies. Inverters shall be used for conversion of D.C. power to A.C. power. All batteries shall have individual diode reverse current protection for prevention of unnecessary power consumption because of a weak or faulty battery. Each battery shall be sealed at sea level pressure to withstand a pressure of 14.7 psi both internally and externally, and shall have a pressure relief valve for maintaining internal pressure between 0 psi and 14.7 psi as required. The batteries shall be vented for release of gas only with vent lines passing through the large pressure bulkhead and terminating in the capsule skin just aft of the bulkhead such that the gas vents overboard. Voltage monitoring shall be provided by the voltmeters located on the main instrument panel. Electrical loads shall be categorized as essential and nonessential and applied through separate busses through separate fuse panels. In event of low battery voltage, the nonessential bus automatically shall be switched "off". The D.C. power control system shall be as depicted in Figures 5a and 5b, Pages 33 and 34 .

3.13.1 MAIN POWER SUPPLY - The main power supply shall consist of three (3) 1500 watt/hour silver zinc batteries. (See Appendix I-C, Item 3 herein for electrical components). Terminal voltage of these batteries shall average approximately 23 volts with a maximum of 29.6 volts and a minimum of 18 volts. The main batteries shall be wired in parallel with diodes for reverse current protection.

The main batteries shall be capable of providing power requirements for the mission as defined in Para. 1.1.1 herein. Monitoring of each battery shall be provided by the voltmeter located in the main instrument panel by indication of available voltage. One battery shall provide power for the special instrumentation required for the LJ-5A mission.

3.13.2 STANDBY POWER - The standby power supply shall consist of two (2) 1500 watt/hour silver zinc batteries. The standby batteries shall have capacity sufficient to provide power to capsule equipment for the duration of the flight as well as a 5.5 hour requirement for post landing components. Selection of automatic operation shall be made by a switch provided on the main instrument panel (see Para. 3.8.8) prior to launch. Selection of automatic mode shall insert standby power into the main power supply system should a failure occur. A standby D.C. warning light shall become illuminated at this time and all nonessential loads deprived of power. The standby system shall automatically continue to supply power to essential loads.

3.13.2.1 ISOLATED POWER - The isolated power supply shall consist of one (1) 1500 watt/hour silver zinc battery. The isolated battery system shall have sufficient capacity to provide power to the pyrotechnic actuated devices (see Para. 3.20).

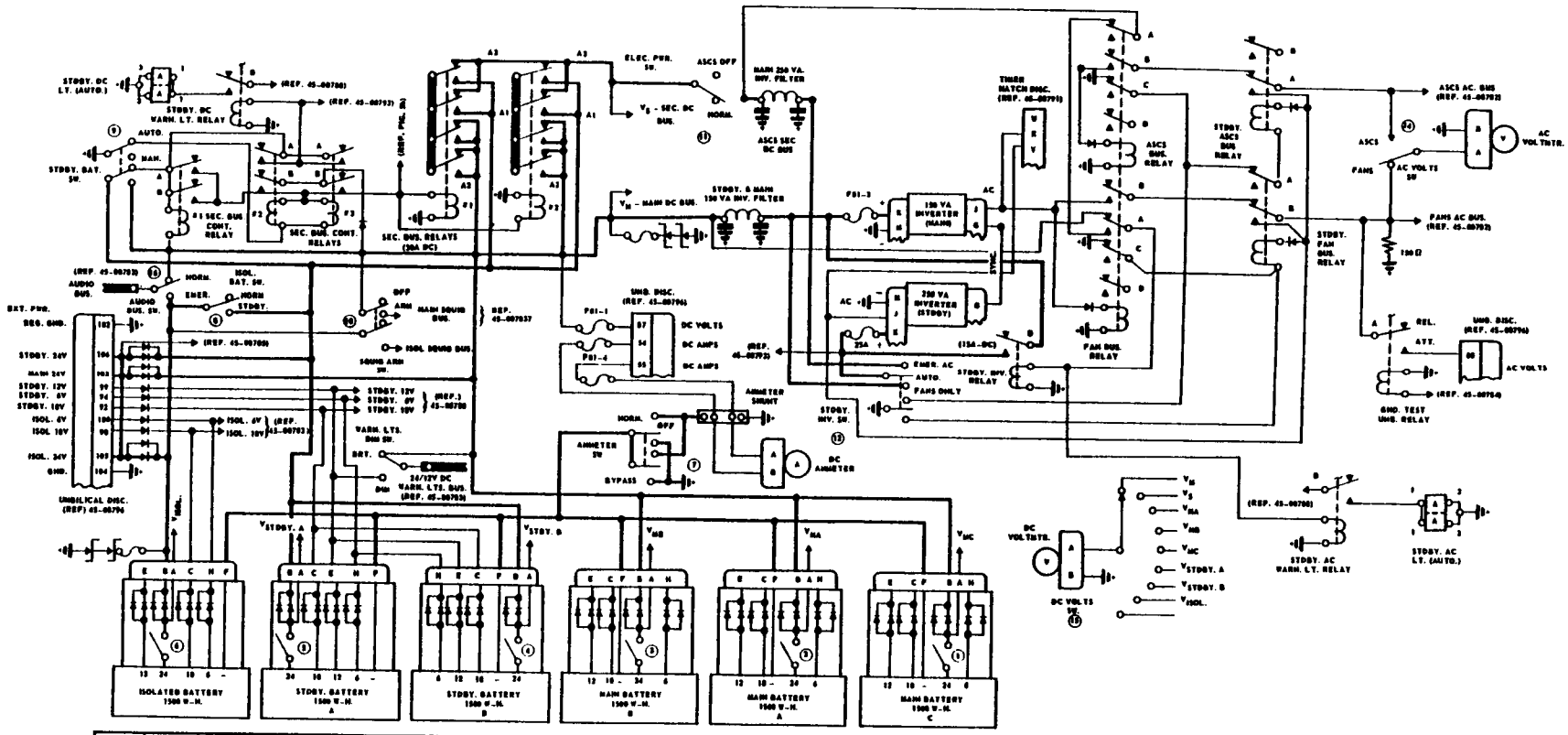
3.13.3 A.C. POWER - A.C. power requirements shall be supplied by conversion of D.C. power through utilization of one (1) 150 VA main static inverter and one (1) 250 VA standby static inverter, in accordance with MAC Drawing No. 45-79709.

The 250 VA inverter shall be mounted on the outboard side of Sta. LX21.625 above Sta. Y0.00 and the 150 VA inverter shall be mounted on the outboard side of Sta. LX12.00 below Sta. Y0.00. The A.C. system shall provide sufficient power for the mission as defined in Paragraph 1.1.1 herein.

3.13.4 ELECTRICAL CONNECTIONS - The electrical system shall be protected against corrosive atmosphere and shorting by floating debris. Design of the electrical system shall be such that there shall be no exposed electrical connections within the capsule.

3.13.4.1 UMBILICAL CONNECTIONS - In order to maintain a fully charged condition on the batteries and to provide power for ground testing of various systems within the capsule, external power shall be supplied to the capsule prior to launching through an umbilical cable and disconnect assembly, MAC Drawing No. 45-79723. This cable shall be attached to the capsule mating receptacle through the open periscope door in accordance with MAC Drawing No. 45-79096. The umbilical coupling device shall afford a secure and a positive connection at the capsule, capable of being released both electrically by a solenoid release mechanism and manually by a lanyard release as specified on MAC Drawing No. 45-79723. It shall be the function of the umbilical connection to provide for the transfer of Freon 114 to the capsule at such a rate and manner as specified on MAC Drawing No. 45-79723.

## POWER SYSTEM CONTROL




| SWITCH | POSITION | OPERATION |
|---|---|---|
| ① | OFF | MAIN 1500 V.-H. BATTERY "C" OFF |
| | ON | MAIN 1500 V.-H. BATTERY "C" ON, SW. ② PERMITTING. |
| ② | OFF | MAIN 1500 V.-H. BATTERY "B" OFF |
| | ON | MAIN 1500 V.-H. BATTERY "A" ON, SW. ② PERMITTING. |
| ③ | OFF | MAIN 1500 V.-H. BATTERY "B" OFF. |
| | ON | MAIN 1500 V.-H. BATTERY "B" ON, SW. ② PERMITTING. |
| ④ | OFF | STDBY. 24V BATTERY "A" OFF. |
| | ON | STDBY. 24V BATTERY "A" AVAILABLE, SW. ② PERMITTING. |

| SWITCH | POSITION | OPERATION |
|---|---|---|
| ⑤ | OFF | STDBY. 24V BATTERY "A" OFF. |
| | ON | STDBY. 24V BATTERY "A" AVAILABLE, SW. ② PERMITTING. |
| ⑥ | OFF | ISOL. 24 V OFF. |
| | ON | ISOL. 24V AVAILABLE, SW. ⑦ PERMITTING. |
| ⑦ | OFF | ALL ELEC. PWR. OFF. |
| | NORM. | AMMETER READS TOTAL CAPSULE PWR., PWR. ON W' SWS. ① THRU ⑤ ARE ON. |
| | BY-PASS | AMMETER BYPASS - PWR. ON W' SWS. ① THRU ⑤ ARE ON. |
| ⑧ | NORM. | ISOL. BATTERY NOT CONNECTED TO MAIN SYSTEM. |
| | STDBY. | CONNECTS ISOL. BATTERY TO STDBY SYSTEM. |

| SWITCH | POSITION | OPERATION |
|---|---|---|
| ⑨ | MAIN | STDBY. BATTERIES CONNECTED TO MAIN SYSTEM. |
| | AUTO. | AUTOMATIC INSERTION INTO MAIN SYSTEM ON PWR. FAILURE, AT REDUCED LOAD ASCS. OFF, STDBY. DC LT. (AUTO.) ON. |
| ⑩ | OFF | ALL SQUIBS OFF. |
| | ARM | PWR. AVAIL. TO FIRE SQUIBS, SWS. ① THRU ⑤ PERMITTING. |
| ⑪ | NORM. ASCS OFF | ALL EQUIPMENT AVAIL. ASCS OFF. |
| | FANS | ENVIRON. CONT. SYSTEM FROM MAIN OR STDBY. INV. |
| ⑫ | EMER. AC AUTO. | ASCS FROM MAIN OR STDBY INV. STDBY. INV. TO ASCS OR FANS ON AC FAILURE. FAN PRIORITY IF BOTH MAIN INVERTERS OUT. |

| SWITCH | POSITION | OPERATION |
|---|---|---|
| ⑬ | | REMOVED |
| ⑭ | FANS | READS AC VOLTS ON FAN BUS. |
| | ASCS | READS AC VOLTS ON ASCS BUS. |
| ⑮ | $V_M$ | READS DC VOLTS ON MAIN BUS. |
| | $V_S$ | READS DC VOLTS ON SEC. BUS. |
| | $V_{MA}$ | READS DC VOLTS ON MAIN 3000 V.-H. BATTERY "A". |
| | $V_{MB}$ | READS DC VOLTS ON MAIN 3000 V.-H. BATTERY "B". |
| | $V_{MC}$ | READS DC VOLTS ON MAIN 3000 V.-H. BATTERY "C". |
| | $V_{STDBY.\ A}$ | READS DC VOLTS ON STDBY. BATTERY "A". |
| | $V_{STDBY.\ B}$ | READS DC VOLTS ON STDBY. BATTERY "B". |
| | $V_{ISOL}$ | READS DC VOLTS ON ISOL. BATTERY. |

| SWITCH | POSITION | OPERATION |
|---|---|---|
| ⑯ | NORM. | AUDIO BUS POWER FROM MAIN BUS. |
| | EMER. | AUDIO BUS POWER FROM ISOL. BATTERY & STDBY. BATTERIES WITH SW. ① PERMITTING. |
| ⑰ | BAT. | WARN. LTS. BUS. POWER FROM MAIN BUS. |
| | DIM | WARN. LTS. BUS. POWER FROM 12V STDBY. BUS. |

FIGURE 5a

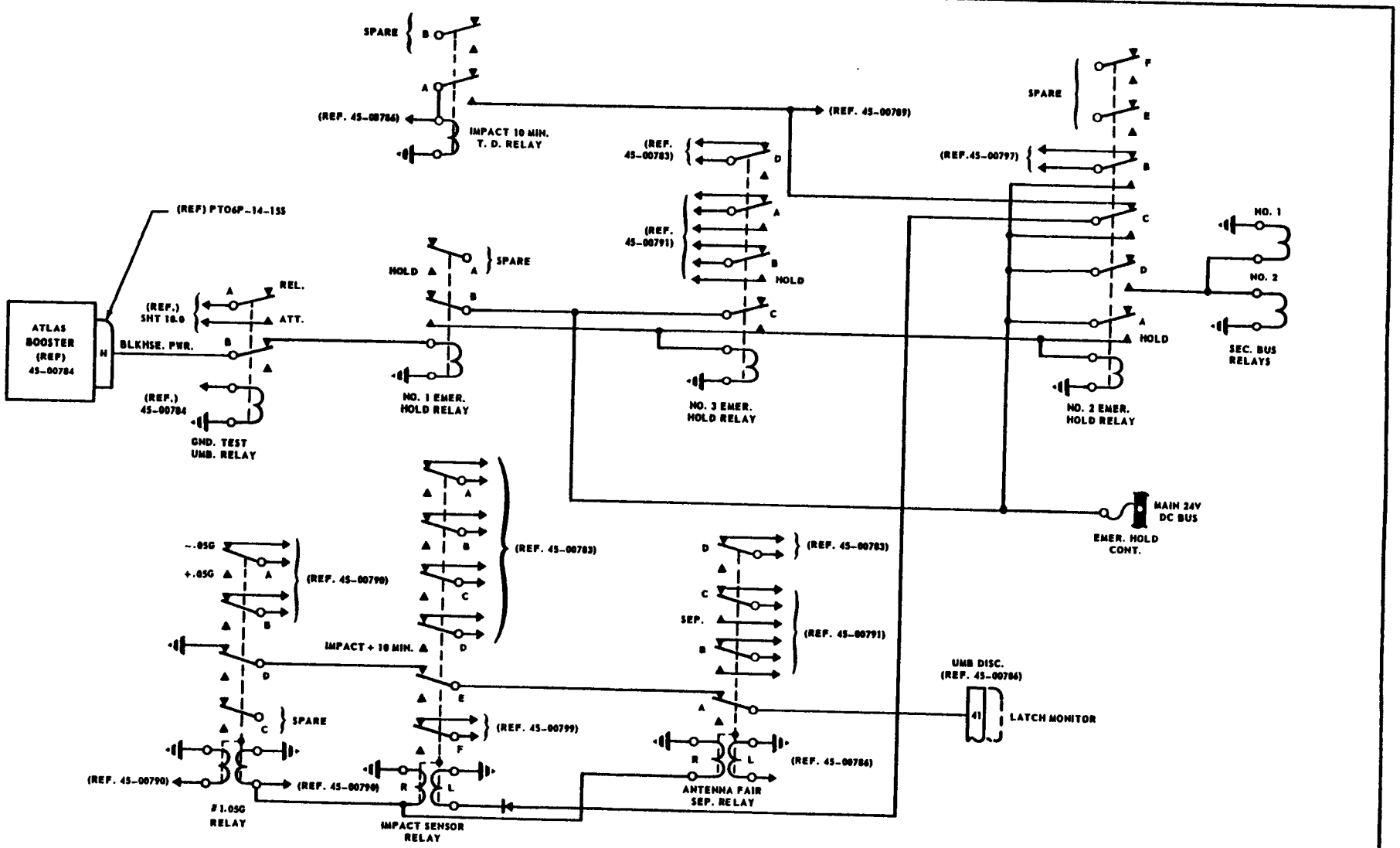

SPARE
B
A
(REF. 45-00786)
IMPACT 10 MIN. T. D. RELAY
(REF. 45-00789)
(REF. 45-00783)
D
A
(REF. 45-00791)
B
HOLD
SPARE
F
E
(REF.45-00797)
B
C
D
A
HOLD
NO. 1
NO. 2
SEC. BUS RELAYS
(REF) PTO6P-14-15S
ATLAS BOOSTER (REF) 45-00784
H
REL.
A
(REF.) SHT 18.0
ATT.
BLKHSE. PWR.
B
(REF.) 45-00784
GND. TEST UMB. RELAY
HOLD
A
SPARE
B
NO. 1 EMER. HOLD RELAY
C
NO. 3 EMER. HOLD RELAY
NO. 2 EMER. HOLD RELAY
MAIN 24V DC BUS
EMER. HOLD CONT.
-.05G
+.05G
A
B
(REF. 45-00790)
D
C
SPARE
(REF. 45-00790)
(REF. 45-00790)
#1.05G RELAY
A
B
C
D
(REF. 45-00783)
IMPACT + 10 MIN.
E
F
(REF. 45-00799)
R
L
IMPACT SENSOR RELAY
D
(REF. 45-00783)
C
SEP.
B
(REF. 45-00791)
A
R
L
(REF. 45-00786)
ANTENNA FAIR SEP. RELAY
UMB DISC. (REF. 45-00786)
41
LATCH MONITOR

FIGURE 5b

3.14 COMMUNICATIONS SYSTEM - Communications provided aboard Mercury Capsule No. 14 shall consist of high and low frequency telemetry transmitters, their power supplies and antenna, and a C-Band radar beacon system. Data shall be telemetered to the Wallops Island ground station to provide necessary real time information concerning the capsule. Telemetry shall afford a back-up in the event onboard data are not retrieved. Reliability shall be obtained through the use of two independent telemetry systems. Both telemetry units shall be energized through the telemetry power supplies at umbilical separation. The telemetry transmitters shall operate continuously through the biconical antenna until antenna fairing separation at which time a coaxial switch shall transfer the units to the descent antenna.

3.14.1 LOW FREQUENCY TELEMETRY TRANSMITTER - The low frequency telemetry transmitter shall operate on 225.7 megacycles with a transmitted power output of 3.3 watts. This unit shall transmit scientific information by means of 7 IRIG standard FM subcarriers, one containing PAM modulation (10.5 kc subcarrier) which shall provide 90 data samples, each measured 1-1/4 times per second. This unit shall satisfactorily transmit any standard IRIG subcarrier channel up to 20 kc with 20 kc deviation and shall be capable of 4-1/2 hours continuous operation.

3.14.2 HIGH FREQUENCY TELEMETRY TRANSMITTER - The high frequency telemetry transmitter shall operate continuously on 259.7 megacycles with a transmitted power output of 3.3 watts. This unit shall have the capability of transmitting a power output of 0.6 watts by a simple ground modification required for conversion to the lower power. This unit shall transmit scientific and angular rate information by means of 7 IRIG standard FM subcarriers, one containing PAM modulation (10.5 kc subcarrier) which shall provide 90 data samples each measured 1-1/4 times per second. This unit shall satisfactorily transmit any standard IRIG subcarrier channel up to 20 kc with 20 kc deviation. When transmitting at 3.3 watts, the high frequency telemetry transmitter shall be capable of 4-1/2 hours continuous operation. When transmitting at 0.6 watts power output, this unit shall be capable of 28 hours continuous operation.

3.14.3 TELEMETER POWER SUPPLY - Two (2) identical transistorized power supplies shall be provided, one for each transmitter. The power supplies shall operate from the capsule D.C. power supply.

3.14.4 TELEMETRY LINE FILTER - A telemetry line filter shall be provided. The line filter shall reduce conducted RF energy being fed directly back from the high frequency telemetry transmitter into the capsule wiring to a level compatible with satisfactory system operation.

3.14.5 C-BAND BEACON - The C-Band radar tracking beacon shall be compatible with the FPS-16 radar system. The C-Band beacon transponder shall consist of a transistorized receiver operating on a 5480.0 megacycle frequency and a transistorized transmitter (except for its magnetron) operating on a 5555.0 megacycle frequency. The transponder input shall be double pulse coded and shall provide sufficient receiver sensitivity to normally attain a range of 805 statute miles (700 nautical miles) at orbital altitude. Power output of this unit shall be 375 watts peak.

3.14.6 C-BAND ANTENNA - A C-Band antenna system capable of operation during all phases of the mission shall be provided. The C-Band beacon shall remain energized until 10 minutes after impact through a time delay energized by the landing system dual inertia switch as indicated on the sequential schematic, Figure 4, Page 30. This antenna system shall consist of three flush helices to provide omnidirectional coverage, with a power divider and matched cabling from the power divider to the antenna. The C-Band antenna shall be externally located in a band around the capsule conical section near the junction of the cylindrical recovery compartment.

3.14.7 BICONICAL ANTENNA - The biconical antenna shall operate through the re-entry phase of the mission. This antenna shall be incorporated into the antenna housing, and shall be jettisoned at 10,000 feet geometric altitude with the fairing. Through a multiplexing system, both telemetry transmitters shall utilize the biconical antenna.

3.14.7.1 MULTIPLEXER - A multiplexer shall be provided to permit simultaneous or individual operation of high and low frequency telemetry transmitters into the biconical antenna. The multiplexer shall be compatible with the UHF descent antenna for use after jettison of the biconical antenna. This unit shall be located in the capsule pressurized area.

3.14.8 UHF DESCENT ANTENNA ARRAY - A wire butterfly type descent antenna shall be provided for supplying omnidirectional coverage. This antenna shall permit simultaneous operation of both telemetry transmitters. The descent antenna shall be located on the capsule parachute housing structure where it shall be tethered until after main chute deployment to prevent possible damage from the chute risers. This antenna shall be spring loaded and shall be extended into the erect operating position after a 16 second time delay from antenna fairing separation by means of a reefing cutter which shall sever the tie-down cord upon actuation.

3.14.9 COMMUNICATIONS CONTROL PANEL - A communications control panel shall be provided in the lower right-hand corner of the instrument panel. The control panel shall contain a "Morse code" keying button for high frequency telemetry transmission control.

3.14.10 COAXIAL SWITCHES - One single pole, double throw, motor-operated coaxial switch shall be provided for switching from the biconical antenna to the descent antenna upon main parachute deployment at 10,000 feet altitude.

3.14.11 COAXIAL CABLES AND CONNECTORS - Raytherm Type 12-080S, 12-233 or 12-234 coaxial cable shall be used for all interconnections between the electronic equipment and antennas. Coaxial connectors shall be of the miniature type.

3.15 RECORDING EQUIPMENT - Recording equipment meeting the requirements of Specification MIL-E-5272A-1 and MIL-E-5400B(ASG) shall be comprised of equipment as specified in the following paragraphs. A satisfactory isolation technique shall be employed to avoid crosstalk or interference between systems being fed from common pick-ups. Methods of data recording within the capsule shall be as noted below, and as depicted in Figure 6, Page40 herein. In addition telemetry equipment for transmitting data from the capsule to ground stations shall be provided as specified in Paragraph 3.14.

a. Tape recording of data

3.15.1 CAMERAS - Cameras shall not be provided on this capsule.

3.15.2 TAPE RECORDER - A tape recorder in accordance with MAC Drawing No. 45-88707, shall be provided for permanent data storage. The recorder shall function continuously during all phases of the mission and for 10 minutes after impact. The tape recorder shall be compatible with the pulse duration modulation system, subcarrier oscillators (VCO) and direct recording mediums. This unit shall have seven heads for recording data at a tape speed of 1-7/8 ips. Tape capacity shall be 4800 feet of 1/2 inch mylar base-tape. A limit switch shall be provided for interrupting power to the recorder in event of tape breakage. Recording tracks shall be as follows:

Track No. 2 - Direct Recording - Accelerometer and Rate Gyro Package

Track No. 5 - Pulse Recording - composite PDM signal from Commutator/Keyer Unit "B" (see Figure 6)

Track No. 6 - Pulse Recording - composite PDM signal from Commutator/Keyer Unit "A" (see Figure 6)

3.15.2.1 COMMUTATED DATA RECORDING - Two PDM/PAM commutator/keyer systems, in accordance with MAC Drawing No. 45-88709, shall be provided. These units shall commutate transducer data and shall supply PDM and PAM outputs. The commutator portion of each unit shall signal inputs at a rate of 112-1/2 samples per second providing 90 data samples, each measured 1-1/4 times per second, producing a signal wave train. The PAM wave train output shall be transmitted to the PAM/PDM converter. The PDM output shall be supplied to a record amplifier which shall produce a signal capable of directly driving a record head in the tape recorder. The PAM output shall be transmitted to ground station automatic decommutation equipment. Each unit shall have its own power to provide required voltages.

3.15.3 VOLTAGE CONTROLLED SUBCARRIER OSCILLATORS - Voltage controlled subcarrier oscillators in accordance with MAC Drawing No. 45-88700 shall be provided. PAM outputs from the commutators and 3 volt D.C. shall apply instrumentation data voltages to the subcarrier oscillators.

3.15.3.1 COMPENSATING OSCILLATORS - A compensating fixed frequency oscillator in accordance with MAC No. 45-88700 shall be provided for monitoring wow and flutter. This shall be adjusted to operate at 3125 cps with an adjustable voltage output.

3.15.3.2 MIXER AMPLIFIER - Two mixer amplifiers in accordance with MAC Drawing No. 45-88700 shall be provided for capsule power conversion from 24 volts D.C. to 6 volts D.C. for use by the subcarrier oscillators. These units shall mix and amplify oscillator outputs for the tape recorder and telemetry transmitters.

3.15.4 SPECIAL INSTRUMENTATION - A special instrumentation installation, MAC Drawing No. 45-88510, shall be provided and shall include an accelerometer and rate gyro package, in accordance with MAC Drawing No. 45-88870, to measure the "g" forces and rate of tumbling encountered during any abnormal conditions which shall occur during the mission of Capsule No. 14 as defined herein. The "g" forces and rates of tumbling shall be measured in the following ranges:

| | | | |
|---|---|---|---|
| Yaw Rate Gyro | ± 100 degrees/sec. | Z axis accelerometer | ± 15g |
| Pitch Rate Gyro | ± 100 degrees/sec. | Y axis accelerometer | ± 8g |
| Roll Rate Gyro | ± 200 degrees/sec. | X axis accelerometer | ± 8g |

The instrumentation installation shall be located between RX9.00 and Z114.84 on BY8.75.

# BASIC INSTRUMENT SYSTEM BLOCK DIAGRAM

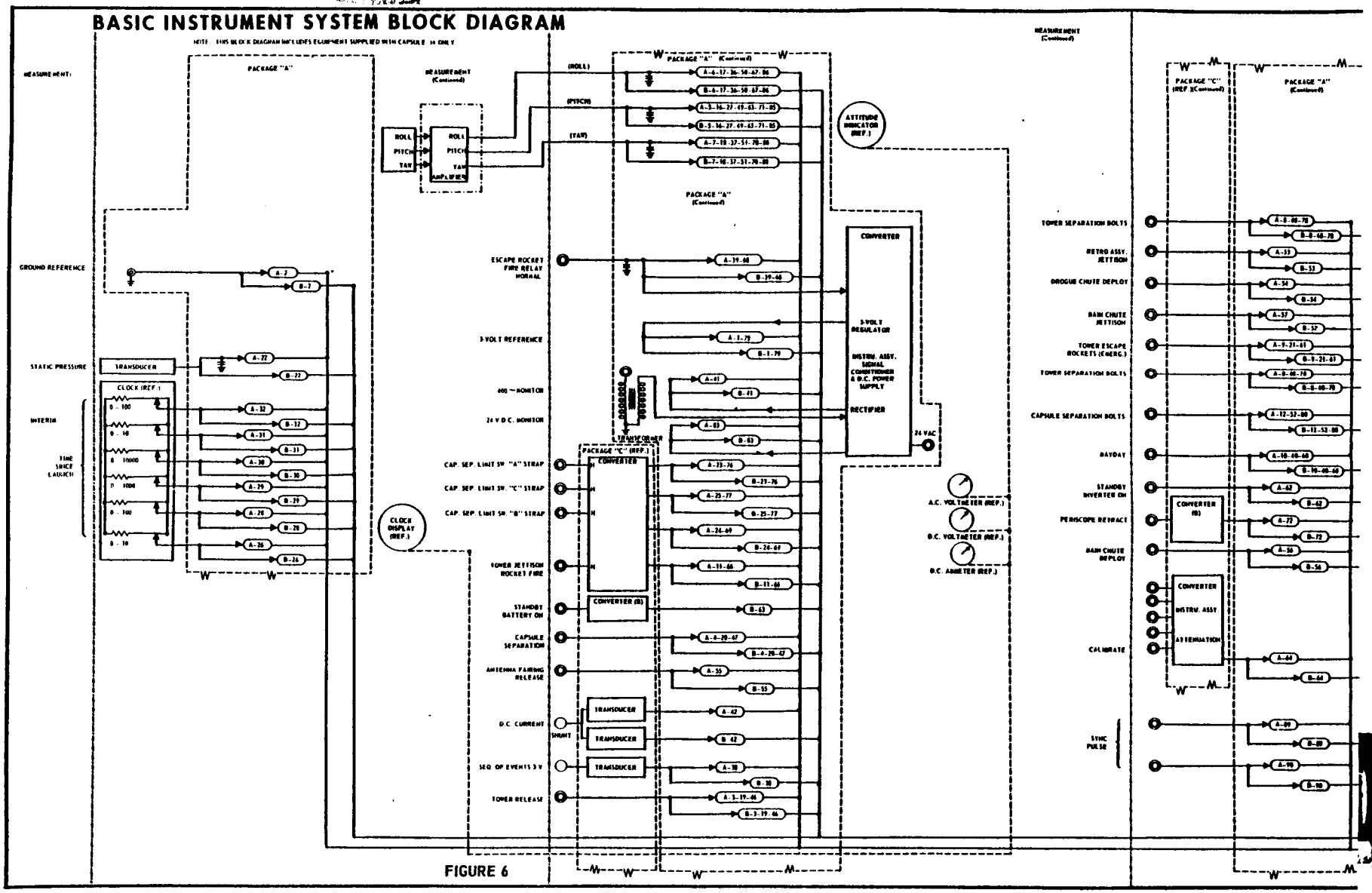
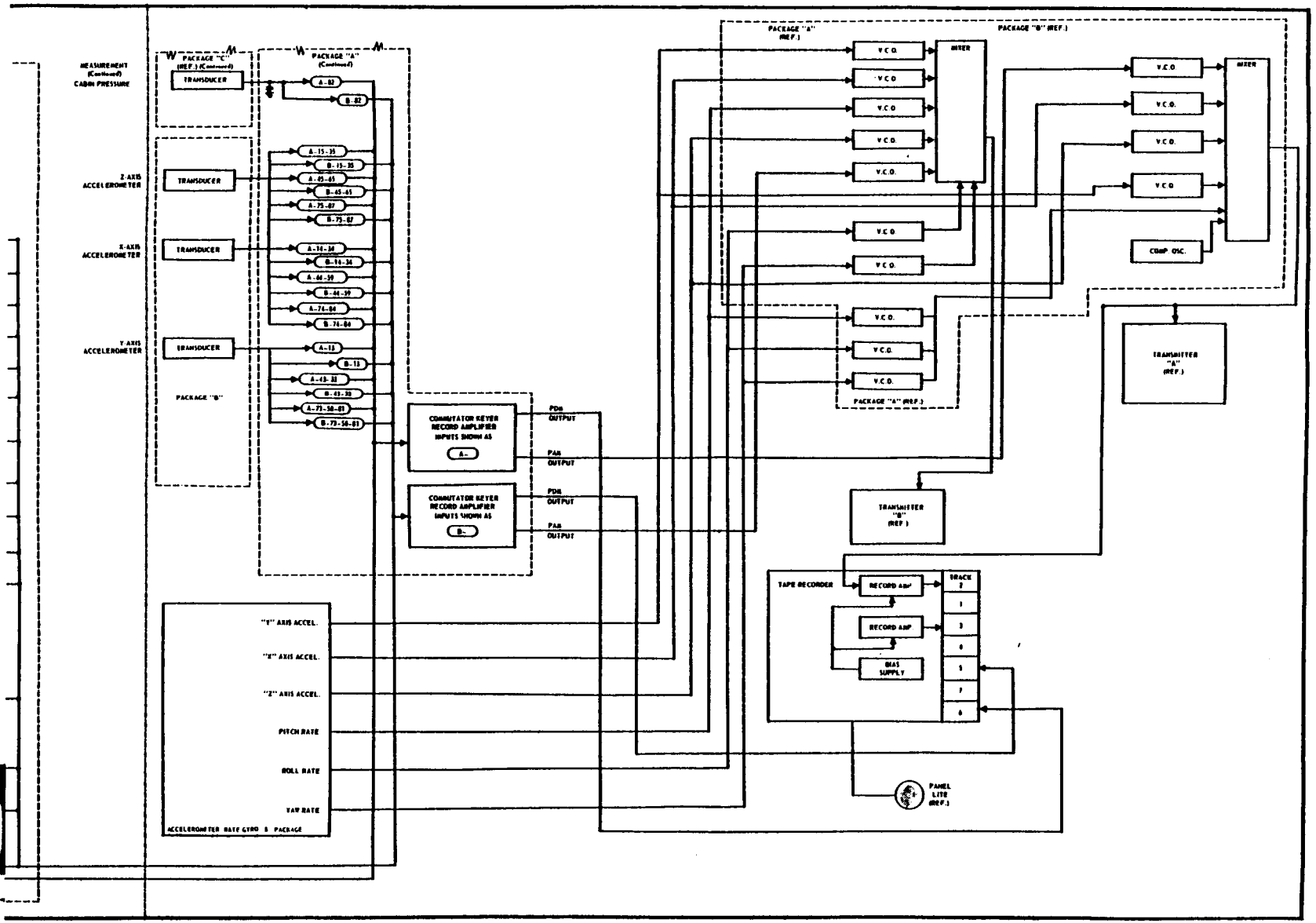



FIGURE 6


MEASUREMENT (Continued) CABIN PRESSURE
PACKAGE "C" (REF.) (Continued)
TRANSDUCER
PACKAGE "A" (Continued)
A-82
B-82
Z-AXIS ACCELEROMETER
TRANSDUCER
A-15-35
B-15-35
A-45-65
B-45-65
A-75-87
B-75-87
X-AXIS ACCELEROMETER
TRANSDUCER
A-14-36
B-14-36
A-46-59
B-46-59
A-74-84
B-74-84
Y-AXIS ACCELEROMETER
TRANSDUCER
A-13
B-13
A-43-33
B-43-33
A-73-50-81
B-73-50-81
PACKAGE "B"
COMMUTATOR KEYER RECORD AMPLIFIER INPUTS SHOWN AS A-
PDM OUTPUT
PAM OUTPUT
COMMUTATOR KEYER RECORD AMPLIFIER INPUTS SHOWN AS B-
PDM OUTPUT
PAM OUTPUT
"X" AXIS ACCEL.
"Y" AXIS ACCEL.
"Z" AXIS ACCEL.
PITCH RATE
ROLL RATE
YAW RATE
ACCELEROMETER RATE GYRO 5 PACKAGE
PACKAGE "A" (REF.)
V.C.O.
V.C.O.
V.C.O.
V.C.O.
V.C.O.
MIXER
V.C.O.
V.C.O.
COMP. OSC.
PACKAGE "B" (REF.)
V.C.O.
V.C.O.
V.C.O.
V.C.O.
V.C.O.
MIXER
V.C.O.
V.C.O.
V.C.O.
V.C.O.
COMP. OSC.
PACKAGE "A" (REF.)
TRANSMITTER "A" (REF.)
TRANSMITTER "B" (REF.)
TAPE RECORDER
RECORD AMP
RECORD AMP
BIAS SUPPLY
TRACK 2
1
3
4
5
7
6
PANEL LITE (REF.)

3.16 NAVIGATIONAL AIDS - Navigational aids such as a chartboard, maps, hand computer and tables, normally provided for astronaut manual navigational procedures shall not be provided in Capsule No. 14 with the exception of the periscope as described below. (This periscope was previously utilized in Mercury Capsule No. 1).

3.16.1 PERISCOPE - An optical periscope, in accordance with MAC Drawing No. 45-86701, shall be installed. (see Appendix I-A, Item 2 herein). This unit shall be located so as to partially support the instrument panel (see Paragraph 3.8.9) such that its display appears in the lower center of the instrument panel. This installation shall provide an optical reference point at FZ 135.59, TY 5.780 and X0.00 station lines, based upon an astronaut's eye reference point at FX 118.20, TY 22.82 and RX 1.28. The periscope shall provide an 8 inch diameter circular display with the image plane inclination at approximately 45 degrees from the Y0.00 axis. The periscope circular display shall provide the following:

a. Outer view of the horizon circle.

b. Center downward view of the spherical earth.

c. High and low magnification of the center view of the point where the vertical intersects the earth's surface. The low magnification shall provide a complete horizon to horizon view. The high magnification center field view shall provide a maximum of 30 degrees with magnification increased accordingly.

d. Target index located in the center for definition of earth position relative to intersection of vertical with the earth's surface.

e. Adjustable altitude indices and visual altitude indication.

f. Attitude indices for indication of pitch and roll attitudes.

g. -43 degree retrograde pitch attitude fixed indices.

h. Fixed reticle lines for alignment of the capsule normal axis with the earth vertical.

i. A $-14^{o}$ 30' true vertical index on upper portion of display.

j. Drift indices and drift set scale for capsule orientation with the ground track.

k. Sun-moon index - A graduated settable 360 degree index about the perimeter for measurement of the angle of the rising or setting sun or moon relative to the capsule longitudinal axis.

3.16.1 PERISCOPE - (Continued)

The lower optical portion of the periscope and the periscope access door shall extend or retract automatically with provisions for manual override. Automatic extension and retraction shall occur in less than 8 seconds each. An amber light located on the upper left of the periscope display shall illuminate at any time when the lower optical portion of the periscope is in any position between located extended and locked retracted in the retract cycle.

3.17 LANDING AND POST-LANDING SYSTEMS - A capsule landing system shall be provided, consisting of components tabulated in Appendix I-C herein, Item 10. The landing system in accordance with MAC Drawing No. 45-41700 shall include two independent parachute systems, sequencing controls, and post-landing equipment. All parachutes, harnesses and parachute bags as specified herein shall be inspected and packed at Port Canaveral, where they will be shipped directly to the launch site.

3.17.1 LANDING SYSTEM - The landing system shall consist of a primary system comprising a main parachute, a drogue parachute, and associated sequencing controls. The reserve parachute system shall be installed but shall be inoperative on this capsule. The landing system sequencing controls shall be armed by the tower separation sensor. For missions aborted between 10,000 feet and 40,000 feet, a time delay between escape tower jettison and drogue chute deployment of a minimum of two (2) seconds shall provide a sufficient time lapse required for various functional sequence during the abort maneuver. For missions aborted at an altitude below 10,000 feet, a second time delay of two (2) seconds shall prevent simultaneous actuation of the drogue mortar and the antenna fairing ejector.

3.17.1.1 DROGUE PARACHUTE SYSTEM - A six (6) foot diameter conical ribbon type drogue parachute assembly with a thirty (30) foot bridle length, shall be provided for adequate dynamic stability and deceleration during the re-entry phase. The drogue chute shall be constructed of cotton, nylon and dacron materials and shall be designed for a dynamic pressure of 116 pounds per square foot considering deployment at a geometric pressure altitude of 40,000 feet. The drogue chute shall be stowed in a drogue chute bag. This assembly and a mortar sabot shall be located in the drogue mortar tube. At 42,000 feet barometric pressure altitude, a barostat (aneroid pressure switch) shall receive static pressure from the recovery compartment, close a switch and complete an electrical circuit to a cartridge squib located under the mortar tube, initiating a gas charge. The gas charge shall force the mortar sabot, and drogue chute assembly from the mortar tube causing the chute to deploy. The drogue chute shall be attached to the antenna fairing by a 3-riser arrangement and shall be released by jettison of the antenna fairing.

3.17.1.2 MAIN PARACHUTE SYSTEM - The main parachute assembly shall be a sixty-three (63) foot diameter reefed (12 percent for 4 seconds) ring-sail type parachute designed to provide a stabilized sinking speed of thirty (30) feet per second at five thousand (5000) feet altitude for a two thousand one hundred sixty (2160) pound capsule. The main parachute of nylon material shall be designed and constructed to withstand shock loads encountered at ten thousand (10,000) feet deployment altitude at velocities up to 295 feet per second true velocity. It shall be considered that there has been no velocity decrement occasioned by drogue chute deployment, so that drogue chute failure cases shall be completely covered. The main parachute

3.17.1.2 MAIN PARACHUTE SYSTEM - (Continued)

shall be stowed in the cylindrical recovery compartment aft of the conical afterbody and its deployment bag lanyard shall be connected to the antenna fairing so that upon antenna jettison, the main chute, as it pulls out of the chute pack, shall be deployed. A parachute deployment bridle, fabricated from 750# tubular nylon webbing, shall be attached to the apex of the parachute in such a manner that the loads encountered upon parachute deployment shall be distributed symmetrically about the apex. This shall take place at ten thousand (10,000) feet geometric pressure altitude as sensed by a barostat (aneroid pressure switch). The barostat shall complete an electrical firing circuit to the antenna fairing ejector assembly subsequently jettisoning the antenna fairing. The barostat shall also initiate extension of the periscope. Upon separation of the antenna fairing, the main chute ejector gas generator assembly shall be electrically initiated, and shall produce gas for injection into the main parachute ejector bag, which, with the antenna fairing, shall eject the main chute pack from the recovery compartment. As this occurs, the main chute shall pull out of the main chute deployment bag, releasing the antenna fairing, drogue chute and bag. At the time of main chute ejection, a SOFAR (dummy) bomb shall be ejected. (see Paragraph 3.17.2.1). Separation of the antenna fairing shall energize the cabin air inlet and exhaust valve "open" circuit for ventilation in low altitude abort maneuvers; switch from the bicone antenna to the UHF descent antenna; and, after a twelve (12) second time delay shall arm the impact sensor (dual inertia switch), and the pressure switch. Gore colors of the main parachute shall be natural and international orange alternately arranged.

3.17.1.3 PILOT PARACHUTE - The pilot parachute shall be installed on this capsule but shall be incapable of being deployed.

3.17.1.4 RESERVE PARACHUTE - The reserve parachute assembly shall be installed on this capsule but shall not be capable of being deployed. At the time of reserve chute ejection, fluorescein dye marker package, attached to the capsule by a lanyard, shall be ejected. (See Paragraph 3.17.2.2). In a normal landing sequence, the reserve chute shall be ejected from the capsule through the closed "rescue aids" toggle switch (P-15) after the pressure switch or the impact sensor (dual inertia switch) has become energized. The reserve chute shall also be ejected after run-out of a ten (10) minute time delay which shall become energized by closure of the impact sensor (dual inertia switch) upon impact. This time delay shall bypass the "rescue aids" toggle switch, and shall energize the same circuitry as the closed "rescue aids" toggle switch (P-15).

3.17.2 POST-LANDING SYSTEM - The post-landing system shall include one SOFAR (dummy) bomb, fluorescein dye marker package, and inertia switches for actuation of equipment essential to recovery.

3.17.2.1 SOFAR BOMB - One (1) dummy SOFAR bomb shall be installed and shall be ejected at main chute deployment at 10,000 feet altitude.

3.17.2.2 FLUORESCEIN DYE MARKER - A fluorescein dye marker package shall be provided to aid in visual location during the search phase. In a normal landing sequence, the marker package shall be ejected after reserve chute ejection and impact on the water. The powder shall be packaged in a water soluble container enclosed by a perforated metal can attached to the capsule by a retainer line.

3.17.2.3 RECOVERY FLASHING LIGHT - A high intensity flashing recovery light in accordance with MAC Drawing No. 45-86702 shall be provided. Flashing rate of the light shall be at least fifteen (15) flashes per minute at an intensity which shall be visible below twelve thousand (12,000) feet at a distance of approximately fifty (50) nautical miles on a starlit moonless night at a relative humidity of at least ninety (90) per cent. The light shall have self-contained batteries.

3.17.2.4 IMPACT SENSOR - The impact sensor (dual inertia switch) shall initiate the following functions:

a. Initiate main parachute disconnect.

b. Initiate the reserve parachute ejector and disconnect and the pilot parachute deployment gun through the closed "rescue aids" toggle switch (P-15).

c. Energize a ten (10) minute time delay which shall, upon run-out, initiate the reserve parachute ejector and disconnect and the pilot parachute deployment gun in the event that the "rescue aids" toggle switch (P-15) should not be closed.

d. Start recovery flashing light.

e. De-energize excess communications and instrumentation.

f. Energize a time delay to maintain low and high frequency telemetry units and the tape recorder until ten (10) minutes after impact.

3.18 HANDLING PROVISIONS - A hoisting loop assembly in accordance with MAC Drawing No. 45-32263 shall be provided for capsule pick-up by helicopter. The loop shall be attached to the recovery compartment structural assembly by two hoist loop support fittings. The hoist loop shall constructed of 9,000 pound capacity dacron webbing with a fiberglass plastic spring strap taped to the dacron to cause the loop to erect upon ejection of the antenna fairing. Two auxiliary hoisting fittings in accordance with MAC Drawing No. 45-32068, located at capsule station line Z123.00 shall be provided.

3.19 SUPPORT EQUIPMENT - Support equipment for Mercury capsule shall be as separately negotiated in CCP 52 Series.

3.20 PYROTECHNICS - Pyrotechnic devices in accordance with MAC Drawing No. 45-72001 (as specified in Appendix I-C, Item 11 herein) shall be provided for the following:

a. Umbilical disconnect

b. Capsule-adapter clamp ring separation

c. Tower clamp ring separation

d. Retrograde package release

e. Parachute deployment and disconnect

f. Antenna fairing ejection

g. Snorkel valve actuation

h. Snorkel inlet door

Pyrotechnics with the exception of snorkel valve squibs shall be installed at the launch site.

4.0 QUALIFICATION

4.1 MAC QUALIFICATION - Qualification of equipment and subsystems shall be accomplished by MAC or by subcontractors under MAC direction as defined in MAC Report 6495 and in component specification control drawings. Qualification status of parts shall be as tabulated in MAC Drawing No. 45-00003.

4.2 NASA QUALIFICATION - The capsules supplied by the contractor will be used in a qualification flight test program to be conducted by the NASA. The capsule and its systems shall demonstrate satisfactory performance within the framework of this specification. This qualification program will have as its final objective the accomplishment of the missions described in Paragraph 1.1.1 herein.

5.0 TESTING

5.1 MAC TESTING - The contractor shall undertake structural, aerodynamic, hydrodynamic, equipment, compatibility, acceptance, and evaluation tests as required in support of the capsule development program.

5.2 NASA TESTING - A program of research and development flight testing of the capsule will be undertaken by the NASA. This program will include full-scale flight tests of simplified capsules of which Capsule No. 14 shall be a part.

6.0 DEFINITION -

| | |
|---|---|
| NASA | National Aeronautics and Space Administration |
| MAC | McDonnell Aircraft Corporation |

APPENDIX I-A

GOVERNMENT FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

| Item | Qty. | Nomenclature | Wt. | Identification |
|---|---|---|---|---|
| 1 | 1 | Adapter Extension Assy. | | NASA: 803305 |
| 1.1 | 1 | Capsule Match Ring | | NASA: LC 803297 |
| 1.2 | 1 | Top Adapter Ring | | NASA: LC 803295 |
| 1.3 | 1 | Bottom Adapter Ring | | NASA: LC 803296 |
| 1.4 | 1 | Pressure Plate | | NASA: LE 802861 |
| 2 | 1 | Periscope (See Para. 3.16.1) | | MAC: 45-86701-3 |

APPENDIX I-B

GOVERNMENT FURNISHED EQUIPMENT - GOVERNMENT INSTALLED

| Item | Qty. | Nomenclature | Wt. | Identification |
|---|---|---|---|---|
| 1 | 1 | Basic Adapter | | |
| 2 | 1 | Special Atlas Adapter Ring (Para. 3.7) | | MAC 45-33501-3 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

GENERAL

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 1 | | General Assembly, Mercury Including: | 45-00001-59 | - - - |
| 1.1 | 1 | Structural Assembly, Pylon | 45-31001-315 | - - - |
| 1.2 | 1 | Antenna Assembly, Communi-cations | 45-31003-305 | - - - |
| 1.3 | 1 | Capsule Assembly | 45-32000-319 | - - - |
| 1.3.1 | 1 | Structural Assembly, Capsule | 45-32001-303 | - - - |
| 1.3.1.1 | 1 | Structural Assembly Conical Section | 45-32002-303 | - - - |
| 1.3.1.1.1 | 1 | Window Assembly, Capsule Inner (Forward Viewing) | 45-35035-301 | - - - |
| 1.3.1.2 | 1 | Structural Assembly Cylindrical Section | 45-32003-301 | - - - |
| 1.3.2 | 1 | Shingle Installation, Capsule | 45-32245-303 | - - - |
| 1.3.3 | 1 | Insulation Installation | 45-32038-309 | - - - |
| 1.3.4 | 1 | Heat Sink Assembly | 45-32051-305 | - - - |
| 1.3.5 | 1 | Door Assembly, Periscope | 45-32091-301 | - - - |
| 1.3.6 | 1 | Pin, Periscope Door Hinge | 45-32093-3 | - - - |
| 1.3.7 | 1 | Window Assembly, Capsule Outer | 45-35030-1 | - - - |
| 1.4 | 1 | Provision Instal.-Little Joe Adapter Wiring | 45-33550-1 | - - - |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

GENERAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 1.5 | 1 | System Installation, Recovery (See Item 10) | 45-41001-314 | - - - |
| 1.6 | 1 | Rocket Installation Retrograde (See Item 2) | 45-50001-307 | - - - |
| 1.6.1 | 6 | Spacer, Adjusting Retro | 45-50014-5 | - - - |
| 1.6.2 | 3 | Retention Assembly, Retrograde Package | 45-72030-301 | - - - |
| 1.7 | 1 | Rocket Installation, Escape (See Item 2) | 45-51001-311 | - - - |
| 1.7.1 | 1 | Escape Rocket Structural Assembly | 45-51002-305 | - - - |
| 1.7.1.1 | 1 | Ballast, Nose | 45-51010-301 | - - - |
| 1.7.1.2 | 2 | Fairing, Rocket Junction Box Lug | 45-51024-1 | - - - |
| 1.7.1.3 | 2 | Fairing, Escape Rocket Tunnel Wiring | 45-51023-1 | - - - |
| 1.8 | 1 | System Installation, Pyrotechnics (See Item 11) | 45-72001-14 | - - - |
| 1.8.1 | 1 | Installation Conical Fairing Pylon to Capsule | 45-72045-1 | - - - |
| 1.8.1.1 | 1 | Fairing Assembly, Pylon to Capsule, Conical | 45-72043-1 | - - - |
| 1.8.2 | 1 | Clamp Ring, Capsule-Adapter | 45-72010-7 | - - - |
| 1.8.3 | 1 | Installation, Antenna Fairing Ejector | 45-72020-303 | - - - |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

GENERAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 1.8.4 | 1 | Installation, Retaining Ring, Pylon to Capsule | 45-72040-1 | - - - |
| 1.9 | 1 | Electrical Installation, Escape Rocket | 45-77000-1 | - - - |
| 1.10 | 1 | Electrical Installation, Pylon | 45-77001-301 | - - - |
| 1.11 | 1 | Electrical Installation, Antenna Fairing | 45-77002-303 | - - - |
| 1.12 | 1 | Electrical Installation, Midsection | 45-78003-313 | - - - |
| 1.13 | 1 | Electrical Installation, Retrorocket | 45-78002 | - - - |
| 1.14 | 1 | Electrical Installation, Adapter Little Joe | 45-79100-1 | - - - |
| 1.15 | 1 | Equipment Installation (See Items 3,4,5,6,7,8 & 9) | 45-80014-1 | - - - |
| 1.15.1 | 1 | R.H. Console Panel | 45-83027-13 | - - - |
| 1.15.2 | 1 | Main Instrument Panel | 45-81100-309 | - - - |
| 1.15.3 | 1 | Panel Assembly, L.H. Console | 45-81110-303 | - - - |
| 1.16 | 1 | Instrumentation Installation Special, Consisting of: | 45-88510-317 | - - - |
| 1.16.1 | 1 | Crushable Support Assembly | 45-82001-35-14 | - - - |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

GENERAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 1.16.2 | 1 | Crushable Support Assembly | 45-82001-39-14 | - - - |
| 1.16.3 | 1 | Crushable Support Assembly | 45-82001-43-14 | - - - |
| 1.16.4 | 1 | Crushable Support Assembly | 45-82001-47-14 | - - - |
| 1.16.5 | 1 | Crushable Support Assembly | 45-82001-51-14 | - - - |
| 1.16.6 | 1 | Shelf Assembly-Accelerometer and Rate Gyro, Including: | 45-88545-1 | - - - |
| 1.16.6.1 | * | Relay Panel Assembly | 45-78016-1 | - - - |
| 1.16.6.2 | * | Inverter | 45-79709-3 | Interelectronics 28T15A40GB-2 |
| 1.16.6.3 | * | Filter | 45-79709-7 | Interelectronics 28FA30GHA-2 |
| 1.16.6.4 | * | Cover | 45-79727-17 | Harris: 33000-17 |
| 1.16.6.5 | * | Cover | 45-79727-19 | Harris: 33000-19 |
| 1.16.6.6 | * | Fuse Block | 45-79727-47 | Harris: 33000-47 |
| 1.16.6.7 | 1 | Accelerometer and Rate Gyro Package | 45-88870-7 | - - - |
| 1.16.7 | 1 | Shelf Assembly-Accelerometer and Rate Gyro, Including: | 45-88545-3 | - - - |
| 1.16.7.1 | 1 | Pallet Assembly | 45-88501-309 | - - - |

* See Electrical Section, Item 4 herein, for Quantities.

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ROCKET INSTALLATIONS

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Mfg. No. |
|---|---|---|---|---|
| 2 | | Capsule Rocket Installations | | |
| 2.1 | 3 | Rocket Assembly, Dummy Retrograde | 45-50700-9 | Thiokol |
| 2.2 | 3 | Rocket, Dummy Posigrade | 45-50701-9 | Atlantic Research: |
| 2.3 | 1 | Rocket, Escape System | 45-51700-3 | Grand-Central: 477-80100 |
| 2.4 | 1 | Rocket, Pylon Jettison Tri-Nozzle | 45-51701-15 | Atlantic-Research: E-20189 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

AIRBORNE EQUIPMENT

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Mfg. No. |
|---|---|---|---|---|
| 3 | | Airborne Equipment, Consisting of: | | |
| 3.1 | 1 | Satellite Clock (Interim) | 45-81059-305 | |
| 3.2 | 1 | D.C. Voltmeter | 45-81716-3 | Weston Instrument: 183537 |
| 3.3 | 1 | D.C. Ammeter | 45-81717-3 | Weston Instrument: 183538 |
| 3.4 | 1 | A.C. Voltmeter | 45-81718-3 | Weston Instrument: 183539 |
| 3.5 | 1 | Transducer (Pitch) | 45-81721-13 | Minneapolis-Honeywell: GG 134A-4 |
| 3.6 | 1 | Transducer (Roll) | 45-81721-15 | Minneapolis-Honeywell: GG 134A-5 |
| 3.7 | 1 | Transducer (Yaw) | 45-81721-17 | Minneapolis-Honeywell: GG 134A-6 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT-CONTRACTOR INSTALLED

ELECTRICAL

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 4 | | Electrical Equipment Consisting of: | - - - | - - - |
| 4.1 | 1 | Diode Panel Assembly, Power System Control | 45-78012-317 | - - - |
| 4.2 | 1 | Relay Panel Assembly, Clamp Ring Separation | 45-78041-301 | - - - |
| 4.3 | 1 | Relay Panel Assembly, Power System Control | 45-78081-339 | - - - |
| 4.4 | 1 | Relay Panel Assembly, Power System Control | 45-78081-337 | - - - |
| 4.5 | 1 | Relay Panel Assembly, Launch, Orbit and Escape Sequential | 45-78084-307 | - - - |
| 4.6 | 1 | Relay Panel Assembly, Launch, Orbit and Escape Sequential | 45-78084-353 | - - - |
| 4.7 | 1 | Relay Panel Assembly, Launch, Orbit and Escape Sequential | 45-78084-327 | - - - |
| 4.8 | 1 | Relay Panel Assembly, Retrograde Sequential | 45-78085-357 | - - - |
| 4.9 | 1 | Relay Panel Assembly, Recovery Sequential | 45-78086-369 | - - - |
| 4.10 | 1 | Relay Panel Assembly, Recovery Sequential | 45-78086-381 | - - - |
| 4.11 | 1 | Relay Panel Assembly Communication and Periscope | 45-78089-313 | - - - |
| 4.12 | 1 | Relay Panel Assembly, ASCS System | 45-78090-341 | - - - |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT-CONTRACTOR INSTALLED

ELECTRICAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 4.13 | 1 | Relay Panel Assembly, ASCS System | 45-78090-333 | - - - |
| 4.14 | 1 | Relay Panel Assembly, Instrumentation Control System | 45-78092-309-14 | - - - |
| 4.15 | 6 | Battery (1500 Watt-Hour) | 45-79707-19 | Eagle Pitcher MAR-4028-B |
| 4.16 | 1 | Static Inverter (250 VA) | 45-79709-1 | Interelectronics: 28T15A40HA-2 |
| 4.17 | 2 | Static Inverter (150 VA) | 45-79709-3 | Interelectronics: 28T15A40GB |
| 4.18 | 3 | Filter Assembly | 45-79709-7 | Interelectronics: 28FA30GHA-2 |
| 4.19 | 56 | Power and Control Relay | 45-79712-2 | Filtors: P26A1H6A9 |
| 4.20 | 39 | Power and Control Relay | 45-79712-8 | Potter-Brumfield: SL4080-1 |
| 4.21 | 4 | Power and Control Relay | 45-79712-12 | Leach: 9227-5369 |
| 4.22 | 3 | Power and Control Relay | 45-79712-15 | Leach: 9226-5368 |
| 4.23 | 7 | Power and Control Relay | 45-79712-16 | Leach: 9224-5367 |
| 4.24 | 4 | Power and Control Relay | 45-79712-33 | Filtors: 26SR18F |
| 4.25 | 11 | Power and Control Relay | 45-79712-34 | Filtors: L126E18 |
| 4.26 | 14 | Power and Control Relay | 45-79712-19 | Leach: 9229-5371 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ELECTRICAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Mfg. No. |
|---|---|---|---|---|
| 4.27 | 14 | Power and Control Relay | 45-79712-21 | Leach: 9220-5366 |
| 4.28 | 3 | Power and Control Relay | 45-79712-22 | Leach: 9228-5370 |
| 4.29 | 3 | Power and Control Relay | 45-79712-23 | Leach: 9223-5375 |
| 4.30 | 1 | Power and Control Relay | 45-79712-26 | Leach: 9274-5300 |
| 4.31 | 2 | Power and Control Relay | 45-79712-27 | Leach: 9274-5377 |
| 4.32 | 2 | Power and Control Relay | 45-79712-28 | Leach: 9229-5372 |
| 4.33 | 2 | Power and Control Relay | 45-79712-32 | Leach: 9220-5378 |
| 4.34 | 4 | Limit Switch | 45-79713-39 | Haydon Switch 61422 |
| 4.35 | | Removed | | |
| 4.36 | 7 | Push Button | 45-79713-23 | Haydon Switch 61375 |
| 4.37 | 6 | Guard | 45-79713-25 | Electro-Snap 42-041 |
| 4.38 | 12 | Limit Switch | 45-79713-29 | Electro-Snap KX5-4-1 |
| 4.39 | | Removed | | |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ELECTRICAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Mfg. No. |
|---|---|---|---|---|
| 4.40 | 2 | Limit Switch | 45-79713-71 | Electro-Snap: H11-127 |
| 4.41 | 1 | Limit Switch | 45-79713-63 | Electro-Snap: H11-122 |
| 4.42 | 2 | Limit Switch | 45-79713-67 | Electro-Snap: H11-124 |
| 4.43 | 1 | Limit Switch | 45-79713-57 | Electro-Snap: H11-119 |
| 4.44 | 1 | Limit Switch | 45-79713-73 | Electro-Snap: H11-128 |
| 4.45 | 4 | Limit Switch | 45-79713-65 | Electro-Snap: H11-123 |
| 4.46 | 2 | Limit Switch | 45-79713-69 | Electro-Snap: H11-125 |
| 4.47 | 3 | Limit Switch | 45-79713-59 | Electro-Snap: H11-120 |
| 4.48 | 5 | Relay - Time Delay 2 Seconds | 45-79715-1 | Wheaton: E371-A |
| 4.49 | 3 | Relay - Time Delay 5 Seconds | 45-79715-7 | Wheaton: E371-D |
| 4.50 | 2 | Relay - Time Delay 10 Seconds | 45-79715-11 | Wheaton: E371-E |
| 4.51 | 3 | Relay - Time Delay 20 Seconds | 45-79715-15 | Wheaton: E371-G |
| 4.52 | 2 | Relay - Time Delay 30 Seconds | 45-79715-17 | Wheaton: E371-H |
| 4.53 | 1 | Relay - Time Delay 300 Seconds | 45-79715-67 | Wheaton: E376-A |
| 4.54 | 2 | Relay - Time Delay 30 Seconds | 45-79715-37 | Wheaton E372-E |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ELECTRICAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Mfg. No. |
|---|---|---|---|---|
| 4.55 | 3 | Relay - Time Delay 60 Seconds | 45-79715-39 | Wheaton: E372-F |
| 4.56 | 1 | Relay - Time Delay 150 Seconds | 45-79715-43 | Wheaton: E375-D |
| 4.57 | 2 | Relay - Time Delay 600 Seconds | 45-79715-45 | Wheaton: E409 |
| 4.58 | 2 | Relay - Time Delay 5 Seconds | 45-79715-51 | Wheaton: E372-G |
| 4.59 | 2 | Relay - Time Delay 10 Seconds | 45-79715-53 | Wheaton: E372H |
| 4.60 | 3 | Relay - Time Delay 1 Second | 45-79715-55 | Wheaton: E372J |
| 4.61 | 4 | Relay - Time Delay 12 Seconds | 45-79715-57 | Wheaton: E372K |
| 4.62 | 2 | Relay - Time Delay | 45-79715-61 | Wheaton: E174 |
| 4.63 | 2 | Relay - Time Delay 2 Seconds | 45-79715-63 | Wheaton: E372R |
| 4.64 | 1 | Telelight Assembly Consisting of: | 45-79720-141 | Grimes: 33340-141-327 |
| 4.64.1 | 1 | Clip | 45-79720-45 | Grimes: 33340-45 |
| 4.64.2 | 2 | Light Assembly (Red) | 45-79720-47 | Grimes: 33340-47-327 |
| 4.64.3 | 1 | Light Assembly (Green) | 45-79720-49 | Grimes: 33340-49-327 |
| 4.64.4 | 1 | Nomenclature Cap (Tower Jett.) | 45-79720-143 | Grimes: 33340-143 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ELECTRICAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Mfg. No. |
|---|---|---|---|---|
| 4.65 | 1 | Telelight Assembly Consisting of: | 45-79720-145 | Grimes: 33340-145-327 |
| 4.65.1 | 1 | Clip | 45-79720-45 | Grimes: 33340-45 |
| 4.65.2 | 2 | Light Assembly (Red) | 45-79720-47 | Grimes: 33340-47-327 |
| 4.65.3 | 1 | Light Assembly (Green) | 45-79720-49 | Grimes: 33340-49-327 |
| 4.65.4 | 1 | Nomenclature Cap (Capsule Sep.) | 45-79720-147 | Grimes: 33340-147 |
| 4.66 | 1 | Telelight Assembly Consisting of: | 45-79720-149 | Grimes: 33340-149-327 |
| 4.66.1 | 1 | Clip | 45-79720-45 | Grimes: 33340-45 |
| 4.66.2 | 2 | Light Assembly (Red) | 45-79720-47 | Grimes: 33340-47-327 |
| 4.66.3 | 1 | Light Assembly (Green) | 45-79720-49 | Grimes: 33340-49-327 |
| 4.66.4 | 1 | Nomenclature Cap (Retro Seq.) | 45-79720-151 | Grimes: 33340-151 |
| 4.67 | 1 | Telelight Assembly Consisting of: | 45-79720-153 | Grimes: 33340-153-327 |
| 4.67.1 | 1 | Clip | 45-79720-45 | Grimes: 33340-45 |
| 4.67.2 | 2 | Light Assembly (Red) | 45-79720-47 | Grimes: 33340-47-327 |
| 4.67.3 | 1 | Light Assembly (Green) | 45-79720-49 | Grimes: 33340-49-327 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ELECTRICAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 4.67.4 | 1 | Nomenclature Cap (Retro Att.) | 45-79720-155 | Grimes: 33340-155 |
| 4.68 | 1 | Telelight Assembly Consisting of: | 45-79720-157 | Grimes: 33340-157-327 |
| 4.68.1 | 1 | Clip | 45-79720-45 | Grimes: 33340-45 |
| 4.68.2 | 2 | Light Assembly (Red) | 45-79720-47 | Grimes: 33340-47-327 |
| 4.68.3 | 1 | Light Assembly (Green) | 45-79720-49 | Grimes: 33340-49-327 |
| 4.68.4 | 1 | Nomenclature Cap (Fire Retro) | 45-79720-159 | Grimes: 33340-159 |
| 4.69 | 1 | Telelight Assembly Consisting of: | 45-79720-161 | Grimes: 33340-161-327 |
| 4.69.1 | 1 | Clip | 45-79720-45 | Grimes: 33340-45 |
| 4.69.2 | 2 | Light Assembly (Red) | 45-79720-47 | Grimes: 33340-47-327 |
| 4.69.3 | 1 | Light Assembly (Green) | 45-79720-49 | Grimes: 33340-49-327 |
| 4.69.4 | 1 | Nomenclature Cap (Jett Retro) | 45-79720-163 | Grimes: 33340-163 |
| 4.70 | 1 | Telelight Assembly Consisting of: | 45-79720-165 | Grimes: 33340-165-327 |
| 4.70.1 | 1 | Clip | 45-79720-45 | Grimes: 33340-45 |
| 4.70.2 | 2 | Light Assembly (Red) | 45-79720-47 | Grimes: 33340-47-327 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ELECTRICAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Mfg. No. |
|---|---|---|---|---|
| 4.70.3 | 1 | Nomenclature Cap (Retract Scope) | 45-79720-167 | Grimes: 33340-167 |
| 4.71 | 1 | Telelight Assembly Consisting of: | 45-79720-169 | Grimes: 33340-169-327 |
| 4.71.1 | 1 | Clip | 45-79720-45 | Grimes: 33340-45 |
| 4.71.2 | 2 | Light Assembly (Red) | 45-79720-47 | Grimes: 33340-47-327 |
| 4.71.3 | 1 | Light Assembly (Green) | 45-79720-49 | Grimes: 33340-49-327 |
| 4.71.4 | 1 | Nomenclature Cap (0.05g Switch) | 45-79720-171 | Grimes: 33340-171 |
| 4.72 | 1 | Telelight Assembly Consisting of: | 45-79720-173 | Grimes: 33340-173-327 |
| 4.72.1 | 1 | Clip | 45-79720-45 | Grimes: 33340-45 |
| 4.72.2 | 2 | Light Assembly (Red) | 45-79720-47 | Grimes: 33340-47-327 |
| 4.72.3 | 1 | Light Assembly (Green) | 45-79720-49 | Grimes: 33340-49-327 |
| 4.72.4 | 1 | Nomenclature Cap (Main) | 45-79720-175 | Grimes: 33340-175 |
| 4.73 | 2 | Telelight Assembly Consisting of: | 45-79720-177 | Grimes: 33340-177-327 |
| 4.73.1 | 1 | Clip | 45-79720-45 | Grimes: 33340-45 |
| 4.73.2 | 2 | Light Assembly (Red) | 45-79720-47 | Grimes: 33340-47-327 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ELECTRICAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Mfg. No. |
|---|---|---|---|---|
| 4.73.3 | 1 | Light Assembly (Green) | 45-79720-49 | Grimes: 33340-49-327 |
| 4.73.4 | 1 | Nomenclature Cap (Rescue) | 45-79720-179 | Grimes: 33340-179 |
| 4.74 | 1 | Telelight Assembly Consisting of: | 45-79720-181 | Grimes: 33340-181-327 |
| 4.74.1 | 1 | Clip | 45-79720-101 | Grimes: 33340-101 |
| 4.74.2 | 2 | Light Assembly (Amber) | 45-79720-103 | Grimes: 33340-103-327 |
| 4.74.3 | 1 | Nomenclature Cap (Stand-by - DC Auto) | 45-79720-183 | Grimes: 33340-183 |
| 4.75 | 1 | Telelight Assembly Consisting of: | 45-79720-185 | Grimes: 33340-185-327 |
| 4.75.1 | 1 | Clip | 45-79720-101 | Grimes: 33340-101 |
| 4.75.2 | 2 | Light Assembly (Amber) | 45-79720-103 | Grimes: 33340-103-327 |
| 4.75.3 | 1 | Nomenclature Cap (Standby - A.C. Auto) | 45-79720-187 | Grimes: 33340-187 |
| 4.76 | 1 | Light Assembly (Abort) | 45-79720-237 | Grimes: 34160-237-313 |
| 4.77 | 1 | Telelight Assembly | 45-79720-241 | Grimes: 33340-241-327 |
| 4.77.1 | 1 | Clip | 45-79720-45 | Grimes: 33340-45 |
| 4.77.2 | 2 | Light Assembly (Red) | 45-79720-47 | Grimes: 33340-47-327 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ELECTRICAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 4.77.3 | 1 | Light Assembly (Green) | 45-79720-49 | Grimes: 33340-49-327 |
| 4.77.4 | 1 | Nomenclature Cap (Landing Bag) | 45-79720-243 | Grimes: 33340-243 |
| 4.78 | 2 | Plug, Tower Elec. Disconnect | 45-79720-1 | Cannon: 39884 |
| 4.79 | 2 | Receptacle, Tower Elec. Disconnect | 45-79722-3 | Cannon: 39885 |
| 4.80 | 2 | Cover, Tower Elec. Disconnect | 45-79722-5 | Cannon: 39886 |
| 4.81 | 1 | Receptacle, Umbilical Disconnect Assembly | 45-79723-1 | Cannon: GMA017072-33 |
| 4.82 | 50 | Fuse (5 Amp) | 45-79727-3 | Harris: 34020-5 |
| 4.83 | 8 | Fuse Block Assembly Consisting of: | 45-79727-39 | Harris: 33000-39 |
| 4.83.1 | 12 | Fuse (5 Amp) | 45-79727-3 | Harris: 34020-5 |
| 4.83.2 | 1 | Fuse Block Assy Shell | 45-79727-61 | Harris: 33000-61 |
| 4.84 | 8<br>1 | Fuse Holder Cover, Each with Angle | 45-79727-7<br>45-79727-67 | Harris: 33000-7<br>- - - |
| 4.85 | 8<br>1 | Fuse Holder Cover, Each with Angle | 45-79727-9<br>45-79727-67 | Harris: 33000-9<br>- - - |
| 4.86 | 6 | Fuse (10 Amp) | 45-79727-11 | Harris: 34020-10 |
| 4.87 | 2 | Fuse Block Assembly Consisting of: | 45-79727-47 | Harris: 33000-47 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ELECTRICAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 4.87.1 | 8 | Fuse (10 Amp) | 45-79727-11 | Harris: 34020-10 |
| 4.87.2 | 4 | Fuse (25 Amp) | 45-79727-13 | Harris: 34020-25 |
| 4.87.3 | 1 | Fuse Block Assy Shell | 45-79727-63 | Harris: 33000-63 |
| 4.88 | 2<br>1 | Fuse Holder Cover, Each<br>with Angle | 45-79727-17<br>45-79727-67 | Harris: 33000-17<br>- - - |
| 4.89 | 2<br>1 | Fuse Holder Cover, Each<br>with Angle | 45-79727-19<br>45-79727-67 | Harris: 33000-19<br>- - - |
| 4.90 | 2 | Fuse Block Assembly | 45-79727-55 | Harris: 33000-55 |
| 4.90.1 | 4 | Fuse (5 Amp) | 45-79727-3 | Harris: 34020-5 |
| 4.90.2 | 8 | Fuse (10 Amp) | 45-79727-11 | Harris: 34020-10 |
| 4.90.3 | 1 | Fuse Block Assy Shell | 45-79727-65 | Harris: 33000-65 |
| 4.91 | 2<br>1 | Fuse Holder Cover,<br>Each with Angle | 45-79727-31<br>45-79727-67 | Harris: 33000-31<br>- - - |
| 4.92 | 2<br>1 | Fuse Holder Cover, Each<br>with Angle | 45-79727-33<br>45-79727-67 | Harris: 33000-33<br>- - - |
| 4.93 | 31 | Switch | 45-79729-79 | Harris: 34000-7 |
| 4.94 | 1 | Switch-8 Position<br>Rotary | 45-79731-1 | Harris: 32000-1 |
| 4.95 | 6 | Toggle Switch | 45-79732-1 | Cutler-Hammer:<br>8906K983 |
| 4.96 | 21 | Toggle Switch | 45-79732-13 | Cutler-Hammer:<br>8906K984 |
| 4.97 | 2 | Toggle Switch | 45-79732-15 | Cutler-Hammer:<br>8906K985 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ELECTRICAL (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Mfg. No. |
|---|---|---|---|---|
| 4.98 | 2 | Toggle Switch | 45-79732-25 | Cutler-Hammer: 8906K986 |
| 4.99 | 1 | Plug Assembly-Antenna | 45-79736-1 | Cannon: 22037-98 |
| 4.100 | 1 | Receptacle Assembly Antenna | 45-79736-3 | Cannon: 22037-99 |
| 4.101 | 5 | Plug Assembly-Retrograde and Adapter | 45-79736-9 | Cannon: 22036-96 |
| 4.102 | 5 | Receptacle Assembly Retrograde and Adapter | 45-79736-11 | Cannon: 22037-97 |
| 4.103 | 1 | Panel Assembly, L.H. Switch | 45-81014-301 | - - - |
| 4.104 | 1 | Flashing Recovery Light | 45-86702-3 | ACR Electronics: ACR113-M |
| 4.105 | 1 | Maximum Altitude Sensor | 45-87708-15 | Donner-Scientific 7005F |
| 4.106 | 1 | Thrust Cutoff Sensor | 45-87709-5 | Donner-Scientific 4403-2-300-020 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT-CONTRACTOR INSTALLED

AUTOMATIC STABILIZATION AND CONTROL SYSTEM

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Minneapolis-Honeywell No. |
|---|---|---|---|---|
| 5 | | Not provided in Capsule No. 14. | | |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT-CONTRACTOR INSTALLED

REACTION CONTROL SYSTEM

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 6 | Not provided in Capsule No. 14. | | | |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

COMMUNICATION SYSTEMS

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Mfg. No. |
|---|---|---|---|---|
| 7 | | Communications System Consisting of: | 45-85700 | Collins: |
| 7.1 | 1 | Panel, Control | 45-85700-31 | Collins: 522 1812 034 |
| 7.2 | 1 | Isolator, Bicone | 45-85700-43 | Collins: 522 1963 012 |
| 7.3 | 1 | Antenna, UHF Descent | 45-85700-49 | Collins: 522 1817 015 |
| 7.4 | 1 | Switch, Coaxial | 45-85700-51 | Transco: 1460 233A |
| 7.5 | 1 | Multiplexer | 45-85700-71 | Microphase: 7M769B-1 |
| 7.6 | 1 | Transmitter, Telemetry - Low Freq. | 45-85700-77 | Texas Instr: 421923-A4 |
| 7.7 | 1 | Transmitter, Telemetry - High Freq. | 45-85700-79 | Texas Instr.: 421923-B3 |
| 7.8 | 2 | Power Supply, Telemetry | 45-85700-81 | Texas Instr.: 421924-3 |
| 7.9 | 1 | Line Filter, Telemetry | 45-85700-83 | Collins: 522 2223 024 |
| 7.10 | 1 | Beacon, C-Band Radar | 45-85700-25 | Avion: 152A200-4Q |
| 7.11 | 3 | Antenna, S and C-Band | 45-85700-33 | Melpar: R436158-1A |
| 7.12 | 1 | Power Divider, C-Band | 45-85700-35 | Melpar: R530310-1A |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ENVIRONMENTAL CONTROL SYSTEM

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION AiResearch No. |
|---|---|---|---|---|
| 8 | | Environmental Control System, Consisting of: | | |
| 8.1 | 1 | Tank, Cooling Water | 45-83089-1 | - - - - - - |
| 8.2 | 1 | Control Box | 45-83095-1 | 510352 Mod. |
| 8.3 | 2 | Cap Assembly, Water Line | 45-83700-69 | PS 173162-1 |
| 8.4 | 1 | Valve, Snorkel Outflow | 45-83700-101 | 121048 |
| 8.5 | 1 | Valve, Snorkel Inflow | 45-83700-211 | 121074-1 |
| 8.6 | 1 | Tube Assembly, $H_2O$ | 45-83700-241 | 174513 |
| 8.7 | 1 | Tube Assembly, $H_2O$ | 45-84700-243 | 174514 |
| 8.8 | 1 | Duct, Cabin Evaporator Steam | 45-83700-177 | 174363 |
| 8.9 | 1 | 2.5 in. Marman Clamp | 45-83700-255 | 4266 |
| 8.10 | 1 | 2.31 in. Marman Clamp | 45-83700-257 | 4365 |
| 8.11 | 1 | "O" Ring for Marman Clamp 45-83700-257 | 45-83700-265 | S 8057BE-265 |
| 8.12 | 2 | "O" Rings | 45-83700-277 | S 8469G-120 |
| 8.13 | 1 | Blower, Cabin Equipment | 45-83700-425 | 207990 |
| 8.14 | 1 | Freon Orifice for Cabin Heat Exchanger | 45-83700-477 | 174906-2 |
| 8.15 | 1 | Heat Exchanger, for Cabin Equipment | 45-83700-481 | 174260-3 |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

ENVIRONMENTAL CONTROL SYSTEM (Cont'd.)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | AiResearch No. |
|---|---|---|---|---|
| 8.16 | 1 | Valve, Post Landing Outflow | 45-83700-719 | 122216-1 |
| 8.17 | 1 | Valve, Ground Ventilation Inlet | 45-83700-723 | 122366-2 |
| 8.18 | 1 | Valve, Cabin Relief | 45-83700-725 | 102416 |
| 8.19 | 1 | Line Assembly | 45-83010-21 | |
| 8.20 | 1 | Line Assembly | 45-83010-23 | |
| 8.21 | 1 | Line Assembly | 45-83010-69 | |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT-CONTRACTOR INSTALLED

INSTRUMENTATION

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 9 | | Instrumentation System, Consisting of: | - - - | - - - |
| 9.1 | 1 | Tape Recorder, Including: | 45-88707-901 | Consolidated Electrodynamics (CEC) |
| 9.1.1 | 1 | Speed Change Kit (1-7/8 ips) | 45-88707-13 | CEC |
| 9.1.2 | 1 | Transport Assembly | 45-88707-15 | CEC |
| 9.1.3 | 2 | Reel | 45-88707-17* | CEC |
| 9.1.4 | 4800 Ft. | Tape, 1/2 inch | 45-88707-19* | Minn.Mining & Mfg. 197 |
| 9.2 | 1 | Instrumentation Package "A" Including: | 45-88100-51 | - - - |
| 9.2.1 | 1 | Pressure Transducer | 45-88705-5 | - - - |
| 9.2.2 | 2 | PDM/PAM Commutator/Keyer | 45-88709-3 | Gen.Devices: 1208D-2B |
| 9.2.3 | 1 | D.C. Power Supply, 3V Monitor | 45-88203-7 MRR No:120ED28 | - - - |
| 9.3 | 1 | Instrumentation Package "B" Including | 45-88101-51 | - - - |
| 9.3.1 | 2 | Accelerometer, "Y" & "X" Axis, ± 4g | 45-88712-5 | Donner: 4310-2 |
| 9.3.2 | 1 | Accelerometer, "Z" Axis, ± 30g | 45-88712-3 | Donner: 4310-1 |
| 9.3.3 | 2 | Voltage Controlled Oscillator -1.3 KC | 45-88700-13 | Dorsett: O-8M1.3KC |

*These items to be shipped to launch site for installation.

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT-CONTRACTOR INSTALLED

INSTRUMENTATION (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 9.3.4 | 2 | Voltage Controlled Oscillator -1.7 KC | 45-88220-9 | - - - |
| 9.3.5 | 2 | Voltage Controlled Oscillator - 2.3 KC | 45-88220-11 | - - - |
| 9.3.6 | 2 | Voltage Controlled Oscillator - 10.5 KC | 45-88220-1 | - - - |
| 9.3.7 | 1 | Compensating Oscillator | 45-88700-53 | Dorsett: 20-8M |
| 9.3.8 | 1 | Mixer Amplifier | 45-88700-55 | Dorsett: ASM-8M |
| 9.3.9 | 1 | Mixer Amplifier | 45-88217-5 | - - - |
| 9.3.10 | 1 | Voltage Controlled Oscillator .560 KC | 45-88700-7 | - - - |
| 9.3.11 | 1 | Voltage Controlled Oscillator - .730 KC | 45-88700-9 | - - - |
| 9.3.12 | 1 | Voltage Controlled Oscillator - .960 KC | 45-88700-11 | - - - |
| 9.4 | 1 | Instrumentation Package "C", Including: | 45-88102-39 | - - - |
| 9.4.1 | 1 | Solenoid Voltage Attenuator | 45-88205-7 | - - - |
| 9.4.2 | 1 | Solenoid Voltage Attenuator | 45-88205-9 | - - - |
| 9.4.3 | 1 | Instrumentation Assembly Rate Signal Filter and Calibrate Card | 45-88214-19 | - - - |
| 9.5 | 1 | Transducer, Static Pressure | 45-88705-5 | CEC: 4-380MU-15A |

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

LANDING AND POST-LANDING SYSTEM

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Radioplane No. |
|---|---|---|---|---|
| 10 | | Landing and Post-Landing System, consisting of: | 45-41700 | |
| 10.1 | 1 | Drogue Chute Assembly, consisting of: | - - | - - |
| 10.1.1 | 1 | Drogue Chute | 45-41700-29* | R-5103-309 |
| 10.1.2 | 1 | Drogue Bag | 45-41700-11* | R-5104 |
| 10.2 | 1 | Mortar Tube | 45-41700-145* | R-5109-309 |
| 10.3 | 1 | Mortar Sabot | 45-41700-19* | R-5126 |
| 10.4 | 1 | Main Chute System, consisting of: | - - - | - - - |
| 10.4.1 | 1 | Landing Parachute | 45-41700-219* | R-5157-321 |
| 10.4.2 | 1 | Bag, Main Chute Deployment | 45-41700-221* | R-5116-305 |
| 10.4.3 | 1 | Lanyard, Antenna | 45-41700-181* | R-5135-309 |
| 10.4.4 | 2 | Cutter Reef - 4 Second Reefing | 45-41700-195* | 101092-1 |
| 10.4.5 | 1 | Reefing Line | 45-41700-199* | R-5157-95 |
| 10.4.6 | 1 | Bridle Parachute | 45-41700-201* | R-5205-301 |
| 10.5 | 1 | Reserve Chute System, consisting of: | - - - | - - - |
| 10.5.1 | 1 | Landing Parachute | 45-41700-219* | R-5157-321 |
| 10.5.2 | 1 | Pilot Parachute | 45-41700-193* | R-5204 |

* These items to be shipped to launch site for installation.

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

LANDING AND POST-LANDING SYSTEM (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Radioplane No. |
|---|---|---|---|---|
| 10.5.3 | 1 | Bag, Reserve Chute Deployment | 45-41700-225* | R-5117-309 |
| 10.5.4 | 1 | Lanyard, Pilot Chute | 45-41700-149* | R-5136-301 |
| 10.5.5 | 1 | Reefing Line | 45-41700-199* | R-5157-95 |
| 10.5.6 | 2 | Cutter Reef - 4 Second Reefing | 45-41700-195* | 101092-9 |
| 10.6 | 2 | Bag, Landing Parachute Ejector | 45-41700-37* | R-5118-301 |
| 10.7 | 2 | Disconnect, Landing Parachute | 45-41700-191 | R-5127-301 |
| 10.8 | 1 | Projectile Assembly, Pilot Chute Deploy Gun | 45-41700-127* | 101070-23 |
| 10.9 | 1 | Shear Pin, Pilot Chute Deploy Gun | 45-41700-63* | 101070-17 |
| 10.10 | 2 | Baroswitch, 10,600 Ft. | 45-41700-163 | 101080-15 |
| 10.11 | 1 | Switch, Inertia | 45-41700-169 | 58215-305 |
| 10.12 | 1 | Packet Assembly, Fluorescein Dye Marker | 45-41700-231* | R-5208 |
| 10.13 | 2 | Baroswitch, 42,000 Ft. | 45-41700-165 | 101080-17 |
| 10.14 | 2 | Strap Assembly, Adjustable Retaining | 45-41700-101 | R-5195 |
| 10.15 | 1 | Strap Non-Adjustable, Insulated | 45-41700-117 | R-5196 |

* These items to be shipped to launch site for installation.

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

LANDING AND POST-LANDING SYSTEM (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Radioplane No. |
|---|---|---|---|---|
| 10.16 | 1 | Body Assembly, Gun, Pilot Chute Deploy | 45-41700-171 | 101070-33 |
| 10.17 | 1 | Electric Squib, Deployment Gun | 45-41700-213* | 58082 |
| 10.18 | 1 | Squib Cartridge, Electric (Drogue Mortar) | 45-41700-211* | 58081 |
| 10.19 | 2 | Cartridge, Squib Electric, (Parachute Disconnect) | 45-41700-209* | 58080 |
| 10.20 | 1 | Cartridge, Main Charge, Deployment Gun | 45-41700-167* | 101070-31 |
| 10.21 | 1 | Gas Generator Assembly | 45-41700-239* | 58217-19 |
| 10.22 | 1 | Gas Generator Assembly | 45-41700-241* | 58217-21 |
| 10.23 | 2 | Cutter Reefing - 16 Second | 45-41700-197* | 101092-7 |
| 10.24 | 2 | Mounting Bracket | 45-41700-205 | 101092-3 |
| 10.25 | 1 | Bag, SOFAR Bomb | 45-41700-227* | R-5207 |
| 10.26 | 1 | Bridle, Pilot Parachute | 45-41700-237* | R-5153-301 |
| 10.27 | 1 | SOFAR Bomb, Dummy | | PDS-007 |

* These items to be shipped to launch site for installation.

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

PYROTECHNICS*

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | Mfg. No. |
|---|---|---|---|---|
| 11 | | Pyrotechnic Devices, Consisting of: | 45-72001-14 | |
| 11.1 | ** | Squib, Deployment Gun | 45-41700-213 | |
| 11.2 | ** | Squib Cartridge, Drogue Mortar | 45-41700-211 | |
| 11.3 | ** | Gas Generator, Main Chute | 45-41700-215 | |
| 11.4 | ** | Gas Generator, Reserve Chute | 45-41700-217 | |
| 11.5 | ** | Squib Cartridge, Parachute Disconnect | 45-41700-209 | |
| 11.6 | ** | Cartridge, Deployment Gun | 45-41700-167 | |
| 11.7 | 2 | Explosive Bolt, Clamp Ring | 45-72702-23 | Olin Matheson: 116C-3 |
| 11.8 | 4 | Explosive Bolt, Clamp Ring | 45-72702-19 | Olin Matheson: 112C-7 |
| 11.9 | 1 | Explosive Bolt, Retrograde Rocket Ejector | 45-72704-9 | Olin Matheson: 113C-3 |
| 11.10 | 5 | Explosive Disconnect Assembly, Consisting of: | 45-72705-1 | Beckman-Whitley: 2243C |
| 11.10.1 | 2 | Explosive Cell | 45-72705-5 | Beckman-Whitley: 10084 |
| 11.10.2 | 1 | Ring Assembly | 45-72705-7 | Beckman-Whitley: |

* Pyrotechnic devices to be shipped to launch site for installation.

** Quantities defined under applicable systems.

APPENDIX I-C

CONTRACTOR-FURNISHED EQUIPMENT - CONTRACTOR INSTALLED

PYROTECHNICS* (Continued)

| Item | Qty. | Nomenclature | IDENTIFICATION MAC No. | IDENTIFICATION Mfg. No. |
|---|---|---|---|---|
| 11.11 | | Antenna Fairing Ejector, Pyrotechnics Kit | 45-72703-17 | |
| 11.11.1 | 2 | Cartridge | - - - | Olin Matheson: ARD863-1 |
| 11.11.2 | 1 | Cartridge | - - - | McCormick Selph: 2561 |
| 11.11.3 | 1 | Cartridge | - - - | Frankford Arsenal: M67E1 |
| 11.12 | 1 | Explosive Ring Dummy | 45-35050-591 | - - - |

* Pyrotechnic devices to be shipped to launch site for installation.

APPENDIX I-D

CONTRACTOR-FURNISHED EQUIPMENT-GOVERNMENT INSTALLED

| Item | Qty. | Nomenclature | Wt. | Identification |
|---|---|---|---|---|
| Not Used | | | | |